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SOME FACTORS CONCERNED IN THE SUCCESS OF OPERATIONS FOR GLAUCOMA

JONAS S. FRIEDENWALD, M.D.

BALTIMORE

Attention is called to the fact that sudden reduction of intraocular tension, as in operations that empty the anterior chamber, results in congestion of the ciliary body. The state thus produced resembles that found in acute glaucoma. To combat this effect the use of retrobulbar injections of adrenalin solution is advocated. From the Wilmer Ophthalmological Institute of the Johns Hopkins University and Hospital. Read before the Congress of the American College of Surgeons, October 15, 1930.

The problem to be discussed may be stated in the following question: What happens to a glaucomatous eye when the anterior chamber is emptied at operation? In all operations for glaucoma, excepting posterior sclerotomy and to a certain degree also cyclodialysis, the sudden emptying of the anterior chamber is a necessary feature of the operative procedure. Let us consider first what happens to a normal eye when the anterior chamber is suddenly emptied. This phase can be studied both by clinical pathology and by animal experiment. Recent investigations have shown that in the normal eye the intraocular capillary pressure exceeds the intraocular pressure by some 20 mm. to 30 mm. of mercury. The walls of the capillaries are able to sustain this pressure difference, to hold back the protein content of the blood plasma, and allow only the slow escape into the intraocular cavity of a protein free filtrate or a dialysate. When the intraocular pressure is suddenly reduced to zero by emptying the anterior chamber, the pressure which the capillary walls within the eye must sustain is approximately doubled. Under these circumstances, the escape of fluid from the capillaries into the intraocular tissues and into the intraocular cavities becomes much more rapid. The walls of the capillaries, at this pressure, are no longer able to hold back the proteins of the blood plasma and the new formed aqueous, the "aqueous of second formation" so-called, contains appreciable amounts of plasma proteins, especially serum al-

bumin.¹ The presence of proteins in the aqueous is accompanied by a rise of pressure to levels somewhat above normal which only in the course of hours is gradually reduced to normal. This course of events following puncture of the anterior chamber in normal eyes has been followed by numerous observers and can be considered as established beyond all question (Fig. 1).

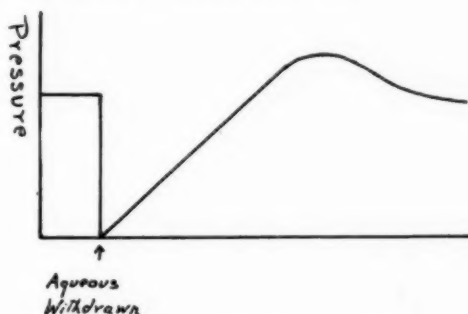


Fig. 1 (Friedenwald). Course of intraocular pressure following withdrawal of aqueous.

Associated with these chemical changes in the aqueous and dynamic changes in the intraocular pressure, a marked edema of all the intraocular tissue occurs, and can readily be demonstrated on histological examination.² There is often a slight edema of the optic disc which may be observed with the ophthalmoscope. The changes which occur in the ciliary body after puncture of the anterior chamber were studied many years ago by Greef³ who showed that there was commonly a diffuse edema of the ciliary body and

processes. He was especially interested in the bullous detachment of the ciliary epithelium which is found in these cases in animal experiment. Such bullae are rarely seen in human beings, but the edema of the ciliary body and processes is all the more pronounced in spite of the common absence of this particular finding. The edema is diffusely distributed throughout the ciliary body (Figs. 2 and 3), not especially pronounced in the anterior portions as is the case in acute glaucoma⁴. Barring this difference in distribution, however, the appearance of the ciliary

the permeability of the intraocular capillaries in chronic glaucoma is greater than in the normal eye. It has been shown⁴ that acute glaucoma is precipitated by a vascular crisis in the ciliary body which expresses itself in a tremendous increase in the permeability of the capillary walls with resultant edema of the ciliary body. There is every reason, therefore, to believe that when the intraocular capillaries are suddenly burdened by an excess of pressure through the sudden drainage of the anterior chamber, there will result an edema of the ciliary body which

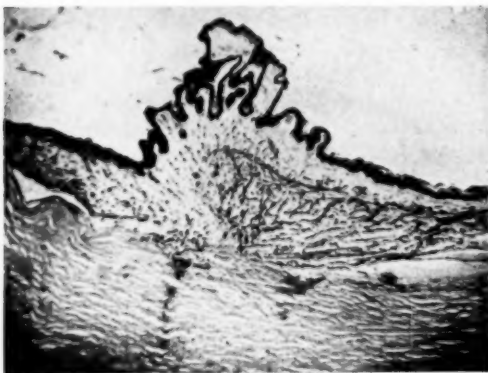


Fig. 2 (Friedenwald). Edema of ciliary body 48 hours after laceration of the cornea.

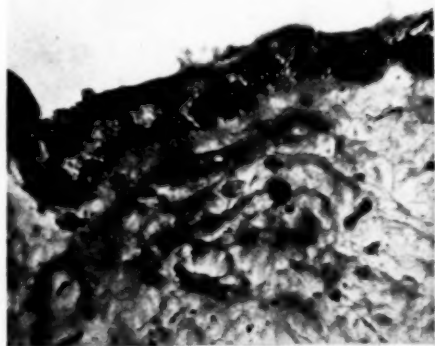


Fig. 3 (Friedenwald). Sheets of fibrin about the capillaries of the ciliary body in a case of perforating wound of the cornea.

body following puncture of the anterior chamber in human cases resembles most closely that found in acute glaucoma. In severe cases the same rings of fibrin about the capillaries of the ciliary body are found, and also the same encroachment on the angle of the anterior chamber.

In summary, then, the anatomic changes in the ciliary body after puncture of the anterior chamber are substantially the same as those which accompany an attack of acute glaucoma. The partial obstruction of the angle of the anterior chamber which results from this change is a most important factor in the development of the secondary glaucoma following penetrating wounds of the cornea⁵.

In operations on glaucomatous eyes all the factors just enumerated are present in exaggerated degree. It has been shown by various workers⁶ that

will be much more marked in cases of glaucoma than in previously normal eyes. Kronfeld⁷, in fact, has found that the aqueous of second formation in glaucomatous eyes has a higher protein content than that in previously normal eyes (Fig. 4).

Superimposed upon the factor of abnormal permeability of the capillaries of glaucomatous eyes, we have the fact that the intraocular pressure before operations is commonly higher than normal and, therefore, that the excess burden placed upon these capillaries is greater in glaucomatous eyes than in normal eyes. These considerations lead one to conclude that evacuation of the anterior chamber in a glaucomatous eye precipitates, in greater or lesser severity, a state anatomically equivalent to an attack of acute glaucoma. Though we may cure the glaucoma by

our surgical procedures in developing new drainage channels for the aqueous, there seems little doubt that every operation for glaucoma, with the possible exceptions of cyclodialysis and posterior sclerotomy, makes the underlying morphological changes in the ciliary body and at the angle of the anterior chamber worse.

This conclusion is amply supported by clinical experience. We are all familiar with the occasional stormy postoperative course of glaucoma cases. Even those that are eventually improved by operation may show a tem-

porary rise of intraocular tension during the first few days following operation. Chemosis of the conjunctiva and lids is a not infrequent postoperative evidence of excessively rapid formation of the aqueous. Delayed reestablishment of the anterior chamber and postoperative increase of peripheral anterior synechiae are complications with which we are all familiar. All of these complications seem more or less directly connected with the postoperative edema of the ciliary body and the resultant relaxation of the zonular ligament. What can be done to minimize these untoward complications?

During the past year I have investigated the effect of retrobulbar injections of adrenalin in relation to this problem. Duke-Elder⁸ has shown that the aqueous of second formation, after retrobulbar injection of adrenalin and

drainage of the anterior chamber, contains only a very small percentage of proteins, hardly above the normal concentration. In a series of dogs I have followed the course of intraocular tension following drainage of the aqueous with and without preliminary retrobulbar injection of 1/4 cc. of a 1/1000 solution of adrenalin hydrochlorid (Fig. 5). The injection is almost always followed by a slight fall in intraocular tension. There is usually miosis, never midriasis. After drainage of the anterior chamber the intraocular tension very slowly returns to normal

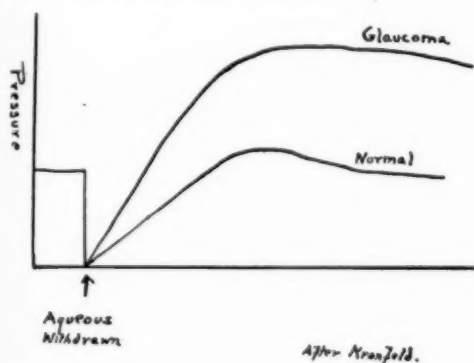


Fig. 4 (Friedenwald). Course of intraocular pressure after withdrawal of aqueous in normal and glaucomatous eyes, after Kronfeld.

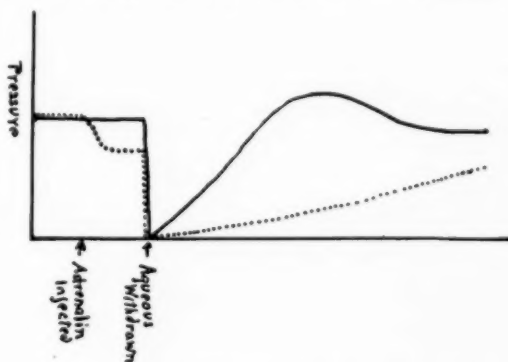


Fig. 5 (Friedenwald). Course of intraocular pressure after withdrawal of aqueous. Solid line represents the normal control. Dotted line shows the effect of a preliminary retrobulbar injection of adrenalin.

levels, reaching the normal in about two hours and never showing the temporary rise above normal which is found during the first hour after drainage of the anterior chamber without previous retrobulbar injection of adrenalin.

In applying this procedure to operations for glaucoma, the following routine has been adopted. During the time that the local anesthetic is being instilled into the conjunctival sac, a retrobulbar injection with a long fine needle is made. One cc. of one percent novocaine with 0.2 to 0.3 cc. of a 1/1000 solution of adrenalin is injected, the needle being inserted through the lower lid near the inferior temporal angle of the orbital margin, and directed into the retrobulbar space between the inferior and external rectus muscles. The oper-

ation is begun between five and ten minutes after the injection. During this short period there is almost always a considerable fall in the intraocular tension, and blanching of the conjunctiva. The pupil does not become dilated. No untoward general symptoms have been observed.

Various operations for the relief of glaucoma have been performed after such retrobulbar injections, without any special complications which could be referred to the injection. The anesthesia is generally better than that obtained by simple conjunctival instillation. Hemorrhage occurs less frequently and less profusely than after the ordinary procedure. One case of hemorrhagic glaucoma following thrombosis of the central vein in a diabetic has been operated on by this method without any further intraocular hemorrhage occurring during or after the operation and with permanent relief of tension.

In a number of trephine operations performed in this manner the cornea became collapsed at the end of the operation and the anterior chamber had to be refilled with salt solution. In these cases the anterior chamber was not obliterated in the days following. Occasionally a small amount of blood appeared in the anterior chamber. In two cases of severe congestive glaucoma profuse hemorrhage into the anterior chamber occurred 24 hours after the operation. These facts bear ample testimony to the persistent postoperative hypotension and the absence of excessive formation of the aqueous.

The procedure was at first performed only in cases of absolute or hemorrhagic glaucoma for fear that a constriction of the retinal vessels as the result of the retrobulbar injection might have a deleterious effect on the vision. As the number of cases treated in this way has increased, it has been found that the fear is unwarranted and that the retinal arterial constriction has not been sufficient to produce a retinal anemia in the face of the low intraocular tension. In no case has there been any loss of the visual field during the

period of operation and postoperative convalescence.

It was also feared at the outset that the arterial constriction produced by the adrenalin might be followed by a subsequent paralysis of the vessel walls with congestion of the eye and increased intraocular tension, but no signs of such a course of events have been noted, though they have been carefully searched for. Eyes which before operation were free from congestion remained so postoperatively. Congested eyes showed no increase in their congestion on the first dressing, rather the contrary.

In one case an injection of pituitrin was substituted for adrenalin but the result was not satisfactory. Commercial preparations of pituitrin contain small amounts of camphor or other substances which are vaso-dilators and which are introduced in order to facilitate the rapid absorption of the pituitary extract when injected hypodermically. Perhaps the local vaso-constricting effect of the pituitrin was interfered with by these additions. I have no experience with the retrobulbar injection of unadulterated pituitrin.

The retrobulbar injection of novocaine with adrenalin is not a new procedure. Many surgeons employ it routinely in all intraocular operations. The only novel features in my recommendation are first, the offering of a new rationale for the procedure, and second, the use of somewhat larger doses of adrenalin than have heretofore been used in common practice. A search through the literature reveals only very rare complications resulting from the retrobulbar injection of adrenalin. In a case reported by Gjessing⁹ the injection was performed during the enucleation of an eye of a patient whose other eye suffered from advanced chronic glaucoma. Shortly after the injection the patient complained that he could not see with his good eye. The blindness persisted for one to two hours and then cleared without residua. The author attributed the transitory blindness in the unoperated eye to the con-

stitutional effects of the adrenalin injection. I offer this case only as a possible warning. No similar accident has occurred in my experience. Occasionally very rare fatalities have been reported following the hypodermic injections of small amounts of adrenalin. Naturally one would not use this drug in cases with severe hypertension or advanced arteriosclerotic disease.

The procedure is of special useful-

ness in cases of congestive glaucoma and in glaucoma simplex in which the intraocular tension prior to operation is high. In non-congestive cases and in those without high tension the post-operative course is usually uneventful even without this procedure. The advantages of using the retrobulbar injection in these cases are, therefore, less conspicuous.

1212 Eutaw place.

References

- ¹ Duke-Elder. Brit. Jour. Ophth., 1928, v. 12, p. 33 and ff., Monograph Supplement.
- ² Fuchs. Arch. of Ophth., 1930, v. 3, p. 419.
- ³ Greef. Pathol. Anat. d. Aug., Hirschwald, Berlin, 1902-1906, p. 250.
- ⁴ Friedenwald, J. S. Arch. of Ophth., 1930, v. 3, p. 560. Friedenwald, J. S. and Pierce, H. F., Arch. of Ophth., 1930, v. 3, p. 574.
- ⁵ Fuchs. Graefe's Arch. f. Ophth., 1908, v. 69, p. 254.
- ⁶ Lindner. Deut. Ophth. Gesell., 1920, p. 33.
- ⁷ Thiel. Graefe's Arch. f. Ophth., 1924, v. 113, p. 347.
- ⁸ Kronfeld. Zeit. f. Augenh., 1930, v. 71, p. 48.
- ⁹ Personal communication.
- ¹⁰ Duke-Elder. Biochem. Jour., 1927, v. 21, p. 66.
- ¹¹ Gjessing. Acta Ophth., 1930, v. 8, p. 206.

EXPERIMENTAL STUDIES IN DIATHERMY APPLIED TO THE EYE AND ORBIT

A. Thermal effect of diathermy

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AND

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CHICAGO

The literature on experimental studies in diathermy is reviewed. This study was carried out on dogs under anesthesia, to determine changes of temperature produced in conjunctival sac, anterior chamber, vitreous chamber and apex of the orbit by passage of high frequency (diathermy) current of graduated strengths. Current strengths of 150ma., 300ma., and 600ma., were employed and temperature changes measured by thermocouple. Average maximum elevations of 4.49° C. in the orbit, 6.98° C. in the vitreous chamber, 6.54° C. in the anterior chamber, and 7.11° C. in the conjunctiva were produced in 15 minutes. The results obtained in this series of 76 experiments are not in conflict with those of previous investigators. From the Department of Ophthalmology and the Department of Physical Therapy, Northwestern University Medical School.

The present investigation was undertaken primarily with the object of making accurate measurements of the elevations of temperature, and temperatures attained, in the eye of the dog during the application of the diathermy current. More specifically, we wished to determine the thermal effects in each of certain selected regions of the eye and orbit, and to make comparisons one with another of the thermal effects attained in each of the several zones.

It has seemed to us desirable to undertake these experimental studies in view of the fact that relatively little experimental investigation of diathermy has been published, and that such experimental work on the eye seems incomplete.

We desired especially to examine into the basis for the statement so frequently made, that by means of diathermy, deep tissues can be raised to a higher temperature than the surface.

Brief survey of previous experimental investigations

In reviewing the literature on diathermy, one is impressed by the great profusion of clinical reports, and also by the relative paucity of experimental studies on this subject.

As our present purpose is to examine experimentally some of the thermal effects of diathermy, we shall avoid any discussion or analysis of the clinical

publications on diathermy, and outline briefly some of the more significant experimental contributions. Experimental investigations into the action of diathermy currents may be divided into two groups: (1) Experiments in vitro, (2) experiments in vivo. Studies of the first group are thus concerned with inanimate material, those of the second group with living animals.

Contributions which belong to the first group are those of Binger and Christie¹ in 1927 and of Pariseau² in 1929. From their study of the action of diathermy currents in vitro, Binger and Christie announced the following conclusions:

(1) That the diathermy current will follow a longer path of low resistance rather than a shorter and more direct path of higher resistance.

(2) That heating occurs first at the periphery, near the electrodes, rather than midway between them.

(3) That only by narrowing the diameter of the conducting material at the center, and thus converging the lines of current flow, can the center be heated to a higher degree than the periphery. These investigators also made numerous ingenious studies of the second group (on animals) to which reference will be made later.

Pariseau² in 1929 published some original work on the action of diathermy currents on agar-potassium nitrate

emulsions impregnated with the thermoscopic substance tetraiodomercuriate of silver. This substance, which is yellow at body heat, and becomes orange at fever heat, makes it possible to observe accurately and to record photographically temperature changes in all parts of the medium. These experiments represent a refinement of the earlier work along similar lines of Bordier³ (1927) and of Bettman and Crohn⁴ (1927). Pariseau draws the following conclusions from his experiments:

(1) Diathermy currents do not flow over the surface of colloid-saline masses, but they go right through, and are capable of heating all through. The path taken by these high frequency currents is very similar to that which would be followed by unidirectional or low frequency currents.

(2) "Maximum heat at the center" is a misleading slogan. In a homogeneous, unobstructed and unstricted electrical field the greatest heating effect is always to be found near the electrodes and not halfway between them. Internal hot spots or islands are possible, however, when there are marked differences of density and electrical resistance in various parts of the medium through which the current passes. It will be seen that these conclusions are in agreement with those of Binger and Christie.

Binger and Christie¹ made numerous "in vivo" experiments, in which they made measurements by means of thermocouples of temperatures produced in various portions of the bodies of animals by diathermy currents. They investigated especially the temperatures in the lungs and heart, and in the principal large vessels of the thorax and abdomen, when diathermy currents are passed through the thorax. They stressed the importance of placing the electrodes parallel to each other and the thermocouple needles at right angles to the electrical field, in order to avoid a concentration of current.

Their findings as to temperatures in the lungs, heart, and large blood vessels, under various conditions which they produced, were as follows:

(1) Prevention of the access of air to one lung, while its circulation is intact, results in little, if any, change in the rate of heating of the lung by the diathermy current.

(2) Occlusion of a main branch of the pulmonary artery during the flow of the current results in a sudden rise of temperature in the lung, the artery of which has been occluded, with subsequent heating, however, at the original rate. Under these circumstances, death of the animal is accompanied by a precipitous rise in the temperature of both lungs.

(3) When the pulmonary veins as well as the artery to one lung are ligated, the circulation through the bronchial vessels is also stopped. Diathermy then results in a local rise in temperature in the lung equivalent to that in the other lung after death.

(4) The temperature in the abdominal aorta is uniform throughout, and varies only with the systemic temperature.

(5) The temperature in the inferior vena cava rises as the heart is approached, reaching its maximum at about the level of the hepatic veins. Between the hepatic veins and the right chambers of the heart there is no further elevation in venous temperature.

(6) The temperature of the right heart blood normally exceeds that of the left heart blood by 0.05° to 0.2°C . During the passage of high frequency currents through the thorax, this relationship is reversed. This indicates that heat is being produced in the lungs but that the blood passing through the pulmonary vessels is removing the heat at approximately the rate of production.

The more general conclusions reached by Binger and Christie are as follows:

(1) The heat gradient of the body is reversed during diathermy and heating occurs from without inward.

(2) Deep heating during diathermy is greater than that which results from the application of local heat to the skin.

(3) The lung can be heated by diathermy in spite of simultaneous cooling of the chest wall.

(4) The efficiency of the local circulation determines to what extent the heat produced by the passage of high frequency currents through the living animal will remain localized to the region where it is produced, or will be disseminated uniformly throughout the body.

Hemingway⁵, in 1930, reported some very interesting and important conclusions from his investigations of the high frequency resistance of the human body, measurements of heat production, and other physical factors concerned in diathermy. He found variations from a minimum of 20 ohms to a maximum of 200 ohms as the high frequency resistance of various parts of the (living) human body in several subjects, using lead electrodes of 10 x 7 sq. cm. area on the chest, and pad electrodes 3 cm. wide encircling the leg. For the soft tissues, resistances of from 20 to 40 ohms were found, and for the denser tissues (including bone) of the limbs and joints, there were higher resistances, varying from 60 to 200 ohms.

Ammeter readings were also shown to be a rather accurate measure of the true heating current, although a suitable wattmeter in the primary circuit was a much more accurate indicator of the heat produced in the patient. He also showed the production of heat in the tissues by diathermy to be a true joule effect.

Some interesting observations were published in 1920 and 1922 by Lucien Howe⁶ concerning temperature changes in the orbit, measured by thermocouples, the heat (or cold) being conducted from the surface of the eyelids. Diathermy was not used in any of these experiments, which were made on a patient in whom, after removal of a sarcoma of the orbit, there remained a persistent fistula through the upper lid extending downward and backward into the posterior portion of the orbit. It was found that by the application to the entire surface of both lids of a mass of ice (2 x 3 cm.) within some 18 minutes there was a temperature reduction of

about 3°C. near the apex of the orbit, at a depth of about 3 cm. However, a rise of temperature of only 1°C. in the same region of the orbit was produced by the application of heat at 54°C. to the surface of the lids by means of a specially constructed heating pad. It was also observed that the temperatures of maximum efficiency, well borne, were between 52° and 56°C., by this method. Howe, in making these experiments, was especially interested in determining the coefficient of thermal conductivity of the eye and orbit, which he found to have a value of 0.0035 for conduction of heat (54°C.), and a value of 0.007 for conduction of cold (0°C.).

In a series of diathermy experiments on the eye and ear, published in 1926, Hollender and Cottle⁷, using dogs, measured the temperatures in the orbit, the vitreous, and under the lids. It was stated that the measurements under the lids were made with the mercurial thermometer, but there was a vague reference to an electrical thermometer, and it was not definitely stated whether the measurements in the orbit and in the vitreous were made with a mercurial thermometer or a thermocouple. They made other experiments with heat by conduction from hot wet dressings at 136°F. and also heat by radiation from an incandescent lamp. In using diathermy, temperature readings were taken just before starting the current, and again after 10 minutes of current flow. They stated that in using 250 milliamperes diathermy current, temperatures were measured in the line of current, and that in using 400 milliamperes, temperatures were measured outside the line of current. Temperature readings for diathermy experiments on the eye were as follows:

Diathermy (low voltage)
250 milliamperes

	Initial Temp.	Temp. in 10 min.
Under lid	94.0°F.	104.7°F.
In vitreous	94.5°F.	103.0°F.
In orbit	96.5°F.	102.4°F.
Rectal	97.5°F.	99.5°F.
Surface	84.2°F.	100.0°F.

Diathermy (high voltage)
400 milliamperes

	Initial Temp.	Temp. in 10 min.
Under lid	96.0°F.	112.0°F.
In vitreous	97.5°F.	110.0°F.
In orbit	98.2°F.	105.0°F.
Rectal	98.8°F.	100.5°F.
Surface	90.0°F.	111.6°F.

The above figures would appear to represent two separate experiments, each on a different dog. There were no statements as to the number of experiments made, the number of dogs used, or as to the uniformity or variations in findings on different dogs.

**Methods employed in present
experiments**

These experimental studies were made upon dogs, for the most part, of body weights between 20 and 40 pounds. The total number of dogs used was 40. Barbitol-ether narcosis was employed throughout the series of experiments. In all cases, barbitol was given by stomach tube, at a sufficient interval (15 to 30 minutes) before induction of ether narcosis, which was continued by tracheal cannula, and each animal was killed at the conclusion of the experiment. At the beginning and at the end of each experiment, the rectal temperature, the pulse and the respiration rates, were recorded; the latter also at intervals of from 3 to 5 minutes, according to their variability, during the experiment. The total number of experiments with diathermy was 95. Owing to technical difficulties in the earlier experiments, many of these were discarded, so that we present in the accompanying tables and charts the results of 76 experiments which were free from technical errors.

Four zones were selected for measurements, by means of the thermocouple, of elevations of temperature produced by diathermy. (1) the conjunctiva (of the lower fornix, or the adjacent bulbar conj.), (2) the anterior chamber, (3) the cavum oculi, and (4) the region of the apex of the orbit. The thermocouple used was in the form of

a hollow metal needle or cannula of the length and caliber usually employed for lumbar puncture. The point of the needle was sharp enough to enter the conjunctiva readily. However, its introduction into the anterior chamber required a small incision, made at the limbus, with a very narrow Graefe knife, and for its introduction into the cavum oculi, a similar incision was made through the equatorial region of the sclera, usually in the superior temporal quadrant, about midway between two venae vorticosae. In order to place the thermocouple near the apex of the orbit a small incision was made through the skin near the outer margin of the orbit, and the thermocouple, entering here, was pushed along the temporal wall of the orbit back to its apex.

The electrodes used, both the small and the large, were flat lead-tin alloy plates. The size of the larger electrode was 8.75 cm. x 7.50 cm., that of the smaller was 5.0 cm. x 3.1 cm. After several comparisons, in which these electrodes were padded with layers of cellucotton of various thicknesses, saturated with saline solution, it was found that the bare metal electrodes, making a firm contact against the closed lids, gave the most satisfactory results, eliminating the arcing of current, and consequent burns of the lids, which often occurred when cellucotton padding was used, because of the difficulty of keeping the pads uniformly moist.

In preliminary experiments to determine suitable current strengths, it was found that 600 ma. was (easily) the maximum experimental toleration by gross observations. Hence the selection of 600 ma. as the maximum dosage, with 300 ma. and 150 ma. as convenient fractions for comparison. At the same time, it was fully realized that the effects produced by these fractional dosages were not to be expected to be in accord with the simple progression expressed by 150:300:600. The actual relationships of the elevations of temperature produced in the various zones by these several dosages will be seen in a subsequent division of this paper.

For the deeper zones, namely the *cavum oculi* and the orbit, it was found that a 15 minute period of observation was adequately long to arrive at a maximum temperature, as will be seen in the tables and curves to follow. These also show that in the superficial zones, a maximum temperature was often reached in a shorter time.

Discussion of methods used in measuring temperature

A thermocouple of copper and "Ideal" wire was employed to measure the temperature of the various zones of the eye. Mercurial thermometers were not used because of their relatively large diameter and low sensitivity. In constructing this thermocouple, well insulated wire of sufficiently small size was chosen so that the hot junction and about two inches of the leads therefrom could be enclosed within a hollow needle. The cold junction was placed in a thermos bottle filled with water as near the initial temperature of the hot junction as practicable. Between the hot junction and the cold junction a Leeds and Northrup galvanometer of the requisite sensitivity was properly connected. The deflection of the galvanometer indicated the degree of disparity in temperature between the hot and cold junctions. The instrument was readily calibrated and a unit deflection of the galvanometer was found to represent a temperature difference of 0.15°C .

For the range of temperatures encountered in this investigation the graph of galvanometer deflections and temperature differences between hot and cold junctions is practically a straight line. Therefore, the temperature at any time was determined by multiplying the deflection of the galvanometer at that time by the calibration constant and adding the product to the temperature of the cold junction at the time the deflection was noted. The deflection was, of course, given its proper sign, positive or negative.

When inserting the thermocouple

into the portion of the eye the temperature of which was to be measured, care was taken to place the needle enclosing the thermocouple along an equipotential surface. By taking this precaution, error in temperature measurement, due to the flow of high frequency currents along the leads to the hot junction, was prevented. During an experiment the cold junction was continually cooling because of radiation of heat from the thermos bottle. Hence, readings of the temperature of the cold junction and of the deflection of the galvanometer were made simultaneously and from the corresponding readings of cold junction temperature and galvanometer deflection temperatures of the hot junction were computed in the manner already described.

In Tables I, II, III, and IV are recorded the temperatures observed in each of the four ocular zones considered, at intervals of 5 minutes, for current intensities of 150, 300, and 600 milliamperes.

It was observed that the relationships between the temperatures measured and the time intervals followed the law expressed mathematically by the equation $T = a + be^{nt}$, in which T is temperature, t , time in minutes, e , the base of the hyperbolic system of logarithms, and a , b , and n , constants for any one ocular zone and current intensity.

The empirical equations of the curves passing through the points the temperature and time coordinates of which were experimentally determined, were readily derived. It will be observed that the initial temperatures were not, however, the same for all zones and current intensities. Hence, in order to make valid comparisons of the heating effect of different current intensities on the various ocular zones it was necessary to translate the vertical axes so that the heating curves all started at the same temperature. In Table V are given the equations of the translated curves and the temperatures at 0, 2, 5, 10, and 15 minutes computed therefrom.

Discussion of experimental data

The thermal effects (temperature elevations) in what we may term the several ophthalmic zones, as measured in our experiments, and shown in the

an arithmetical relation to the numerical milliamperage values for different strengths of current in the same zone. However, these relationships follow certain definite biophysical laws, as set

Table I
ORBIT

A. 150 ma.

Weight	Pulse	Respiration	Temp. 0 min.	Temp. 5 min.	Temp. 10 min.	Temp. 15 min.	Rise
—	—	—	37.90	38.70	38.90	39.12	1.23
38	—	—	36.40	37.00	37.00	37.10	0.70
25	—	—	36.50	37.15	37.10	36.95	0.45
21	—	—	36.40	37.15	37.30	37.30	0.90
21	—	—	35.20	36.30	36.40	36.40	1.20
16	—	—	37.42	38.25	38.42	38.47	1.05
29	—	—	38.33	38.80	38.80	38.80	0.47
—	—	—	39.48	39.85	40.20	40.25	0.77
			37.20	37.90	38.02	38.05	0.85

B. 300 ma.

40	140	16	39.17	39.95	40.05	40.15	0.98
40	140	16	39.90	40.15	40.20	40.15	0.25
38	160	25	38.08	38.65	39.05	38.85	0.77
38	160	25	38.10	38.70	38.80	38.85	0.75
25	170	64	39.95	41.50	41.85	41.90	1.95
25	160	32	35.05	35.55	35.38	35.30	0.25
25	160	32	35.12	35.65	35.52	35.65	0.53
25	160	28	37.70	37.90	37.90	37.98	0.28
26	120	20	38.98	39.40	39.50	39.55	0.57
36	170	20	39.12	39.90	39.90	39.75	0.63
33½	128	14	38.00	38.60	38.70	38.70	0.70
44	160	36	39.65	40.05	40.20	40.20	0.55
			38.24	38.83	38.92	38.92	0.68

C. 600 ma.

44	160	36	39.60	41.20	41.25	41.05	1.45
33½	128	14	38.10	39.70	40.00	39.95	1.85
36	170	20	39.15	41.50	41.60	41.70	2.55
26	120	20	38.60	40.60	40.90	40.95	2.35
25	160	32	35.00	37.10	37.30	37.25	2.25
25	160	32	35.05	37.30	37.60	37.65	2.60
25	160	28	36.90	39.80	40.50	40.60	3.70
25	170	64	40.30	44.20	43.85	44.08	3.78
38	160	25	38.25	40.35	40.85	40.95	2.70
40	140	16	39.43	41.80	42.00	42.30	2.87
40	140	20	39.95	40.65	41.40	41.50	1.55
			38.20	40.38	40.66	40.72	2.50

accompanying tables and graphs, exhibit certain relationships to each other, which are not directly uniform in proportion to the depth of the zone below the surface, for currents of any given milliamperage, nor do the effects show

forth in a preceding paragraph. In regard to our selection of the fifteen minute period of observation, it will be noted that in all cases a maximum temperature was reached within this time, so that a longer period would have been

Table II

A. 150 ma.

CAVUM OCULI

Weight	Pulse	Respira- tion	Temp. 0 min.	Temp. 5 min.	Temp. 10 min.	Temp. 15 min.	Rise
25	—	—	35.56	36.83	37.52	37.65	2.07
21	—	—	35.07	36.84	36.62	35.93	0.86
16	—	—	36.42	37.28	37.68	38.10	1.68
25	100	28-48	36.00	36.75	36.90	36.90	0.90
25	160	28	36.60	37.58	37.80	37.93	1.33
			35.93	37.06	37.30	37.30	1.37

B. 300 ma.

33½	128	10	38.60	39.65	39.85	40.10	1.50
26	120	20	39.05	40.25	40.50	40.58	1.53
30	164	56	38.68	39.73	40.00	40.10	1.42
28	160	28	36.00	36.40	36.70	36.80	0.80
28	160	28	36.12	36.65	36.85	37.03	0.91
25	160	28	36.38	36.90	37.35	37.50	1.12
			37.47	38.26	38.54	38.68	1.21

C. 600 ma.

36	170	32	39.85	43.88	43.90	43.75	3.90
26	120	20	38.55	42.03	43.70	43.80	5.25
35	180	52	39.50	42.38	42.65	42.78	3.28
35	160	52	39.55	42.20	42.60	42.65	3.10
32	160	36	37.38	42.05	42.80	43.00	5.62
32	160	36	38.08	42.00	42.90	42.63	4.55
30	164	56	37.60	42.38	43.33	42.98	5.38
30	164	56	38.43	42.13	42.63	42.83	4.40
			38.62	42.38	43.06	43.05	4.43

Table III

A. 150 ma.

ANTERIOR CHAMBER

Weight	Pulse	Respira- tion	Temp. 0 min.	Temp. 5 min.	Temp. 10 min.	Temp. 15 min.	Rise
16	—	—	35.98	39.43	40.21	40.65	4.67
29	—	—	38.30	39.60	39.98	40.10	1.80
—	—	—	39.45	40.41	40.51	40.51	1.06
			37.91	39.81	40.23	40.32	2.51

B. 300 ma.

27	164	30	36.05	39.55	40.20	40.55	4.50
27	164	30	36.10	40.45	41.10	41.45	5.35
27	164	30	36.75	40.85	41.35	41.75	5.00
27	164	30	37.33	41.03	41.50	41.80	4.47
			36.56	40.47	41.04	41.39	4.83

C. 600 ma.

22	148	34	36.15	41.43	42.48	42.75	6.60
22	148	34	36.45	41.25	42.95	42.75	6.30
22	148	34	36.60	41.53	42.25	42.10	5.50
22	148	34	35.60	43.50	42.85	42.25	6.65
			36.20	41.93	42.63	42.46	6.26

superfluous for the determination of the maximum.

In arriving at explanations for these thermal variations, we must take account of certain anatomical and physio-

This condition in general holds true in our experiments, but is modified by variations of electrical conductivity and resistance according to the various kinds of tissues in the current path. The

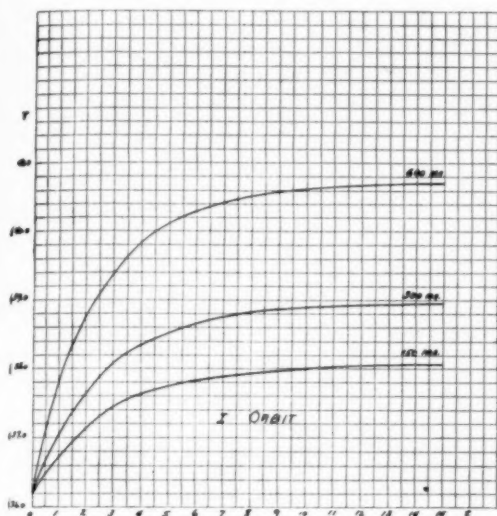


Fig. 1

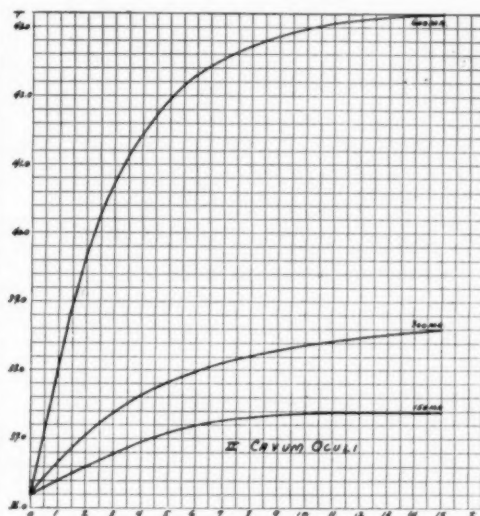


Fig. 2

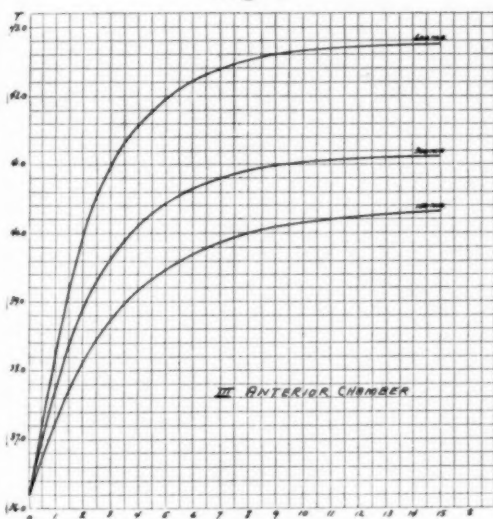


Fig. 3

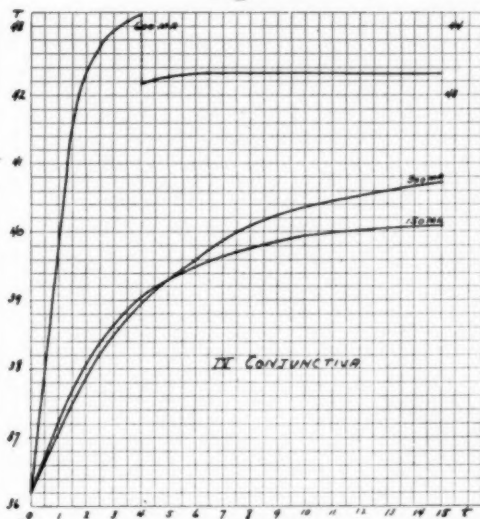


Fig. 4

Figs. 1, 2, 3, and 4. Curves represent rise in temperature in orbit, cavum oculi, anterior chamber, and conjunctiva, respectively, with 150 ma., 300 ma., and 600 ma. currents. Base line represents time in minutes; ordinate represents degrees centigrade.

logical factors which concern the production and dispersion of heat. If the diathermy (high frequency) current were passed through a physically homogenous medium, the heat production would be greatest near the electrodes.

most important factors in the dispersion of the heat produced are (1) radiation, and (2) absorption by the tissues, especially by the blood stream, which thus disperses the heat throughout the body.

Let us consider what effects on heat production and dispersion we may expect *a priori* from the anatomical and physiological conditions in each of the zones tested, and then compare these probabilities with the actual findings of our experiments. Beginning with the most posterior zone, the region of the

conduction and by a greater absorption and carrying away of heat by the blood stream in this location (ophthalmic veins).

How do the results shown on the charts compare with these probabilities? Upon comparing the maximum temperature rise in the orbit with that

Table IV
CONJUNCTIVA

A. 150 ma.

Weight	Pulse	Respiration	Temp. 0 min.	Temp. 5 min.	Temp. 10 min.
16	—	—	34.43	38.28	38.80
29	—	—	37.15	40.15	41.02
			35.79	39.22	39.91

B. 300 ma.

35	160	40	35.40	40.05	41.25
30	166	36	36.57	—	41.40
30	166	36	36.80	40.05	40.38
30	166	36	37.05	39.28	39.73
30	166	36	36.88	39.70	39.95
30	166	36	36.75	38.15	39.65
			36.58	39.45	40.39

C. 600 ma.

			0 min.	2 min.	4 min.
31	180	48	37.20	41.45	42.00
31	180	48	36.85	43.45	43.95
31	180	48	37.60	43.80	43.35
31	180	48	37.20	43.20	43.93
31	180	48	37.15	42.95	43.45
32	180	44	38.70	39.65	—
32	180	44	39.30	43.05	42.50
			37.71	42.51	43.20

apex of the orbit, we would anticipate a relatively low rate of heat production because of the rather great distance from the small electrode, as compared to the superficial zones. Thus we would expect a slower rise of temperature to the maximum, which would be reached only after a longer time, and a lower net final temperature, or maximum, than in the conjunctiva or anterior chamber. Although heat dispersion from the orbit does not occur by radiation this may be counterbalanced by

in the anterior chamber, we have the following:

	150 ma.	300 ma.	600 ma.
Orbit	1.84°C.	2.74°C.	4.49°C.
Anterior Chamber	4.11°C.	4.92°C.	6.54°C.

These ratios are not at variance with the conditions of heat production and dispersion in the orbit as discussed above.

Comparison of the maximum temperature rise in the orbit with that in the cavum oculi shows the following:

	150 ma.	300 ma.	600 ma.
Orbit	1.84°C.	2.74°C.	4.49°C.
Cavum Oculi	1.17°C.	2.38°C.	6.98°C.
(Vitreous)			

Here we note that with currents of 150 and 300 milliamperes a slightly greater temperature rise occurs deep in the orbit, than in the more superficial region of the cavum oculi, filled with

The vitreous body may be regarded as having a certain capacity for the absorption of heat, because its exceptional homogeneity promotes an even and rapid distribution throughout its relatively large mass of all the heat produced within it. This peculiarity would tend with currents of low or moderate heat production to retard and limit the

Table V

SUMMARY AFTER TRANSLATION OF CURVES TO COMMON INITIAL TEMPERATURE OF 36.20°C.

Ocular Zone	MA.	Equation	Temp. 0 min.	Temp. 2 min.	Temp. 5 min.	Temp. 10 min.	Temp. 15 min.	Rise
Orbit	150	$T = 38.05 - 1.85e^{-0.35t}$	36.20	37.13	37.73	37.99	38.04	1.84
	300	$T = 38.94 - 2.77e^{-0.376t}$	36.20	37.63	38.52	38.88	38.94	2.74
	600	$T = 40.7 - 4.48e^{-0.41t}$	36.20	38.73	40.12	40.63	40.69	4.49
Cavum Oculi	150	$T = 37.37 - 1.47e^{-0.31t}$	36.20	36.59	37.06	37.37	37.37	1.17
	300	$T = 38.69 - 2.49e^{-0.207t}$	36.20	37.04	37.80	38.37	38.58	2.38
	600	$T = 43.22 - 7.00e^{-0.342t}$	36.20	39.68	41.95	42.99	43.18	6.98
Anterior Chamber	150	$T = 40.35 - 4.15e^{-0.303t}$	36.20	38.10	39.44	40.15	40.31	4.11
	300	$T = 41.14 - 4.95e^{-0.385t}$	36.20	38.86	40.42	41.03	41.12	4.92
	600	$T = 42.75 - 6.55e^{-0.42t}$	36.20	39.92	41.94	42.65	42.74	6.54
Conjunctiva	150	$T = 40.09 - 3.9e^{-0.32t}$	36.20	38.04	39.30	39.93	40.06	3.86
	300	$T = 40.85 - 4.65e^{-0.223t}$	36.20	37.87	39.28	40.35	40.69	4.49
	600	$T = 43.31 - 7.1e^{-0.97t}$	36.20	42.28	43.25	43.31	43.31	7.11

the vitreous. In order to account for such a ratio, we must consider the peculiar features of the interior of the eye, filled with the vitreous, as they may modify heat production by the diathermy current, and heat absorption and dispersion.

The nonvascular, homogeneous vitreous body presents a situation with regard to heat production which is rather different from the other zones tested.

rise of temperature, owing to the uniform heating of the vitreous body as a whole. With a current of high heat production, sufficiently high to exceed the point of equilibrium between heat production and dispersion, there would be relatively a more rapid rise to a high maximum. This phenomenon would be accentuated by a low heat dispersion, which undoubtedly obtains in the vitreous body, heat dispersion from which is

probably less than from orbital tissues of equal depth, because the sclera tends to inhibit conduction and because the nonvascularity of the vitreous does not

relatively low or moderate rate, no very marked or rapid rise of temperature occurs, until the point of equilibrium between heat production and dispersion

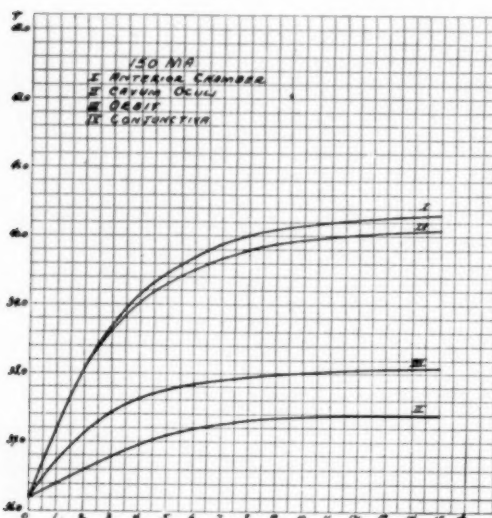


Fig. 5

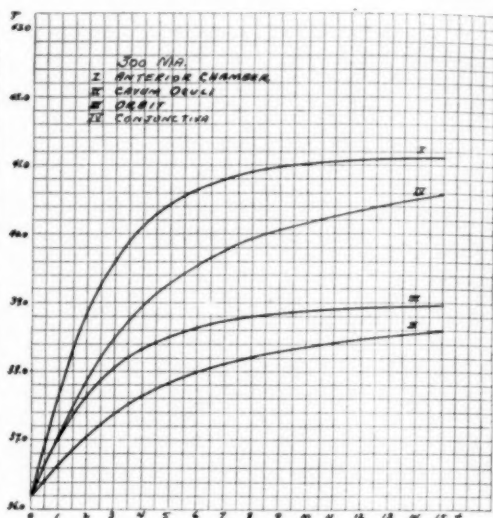


Fig. 6

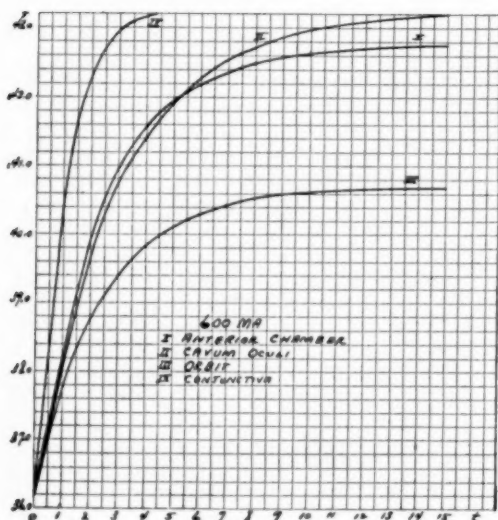


Fig. 7

Figs. 5, 6, and 7. Curves represent comparative rise in temperature in various regions of eye with the 150 ma., 300 ma., and 600 ma. currents, respectively.

favor heat dispersion by the blood stream.

Briefly then, heat is uniformly distributed throughout the vitreous body, so that if the heat production is at a

of heat from the vitreous to surrounding tissue is passed. This explains for us the fact that with currents of low (150 ma.) or moderate (300 ma.) intensity, the temperature does not rise so high in the vitreous body (cavum oculi) as in the posterior part of the orbit, (see tables and charts), since these currents evidently do not raise the temperature above the point of equilibrium. When heat is produced at a much higher rate, however, as by the 600 ma. current, so that the point of equilibrium is exceeded, then we have a cumulative effect, or storage of heat in the vitreous body, accentuated by the low rate of heat dispersion, as above noted. Thus we see that the 600 ma. current gives a maximum temperature rise in the vitreous body of 6.98°C . which is about 2.5°C . higher than that in the orbit, and is almost 0.5°C . higher than that in the anterior chamber.

We therefore observe that the rise of temperature is not always proportional to the distance from the smaller electrode, owing to the various anatomical and physiological factors which modify the physical conditions.

Summary and Conclusions

It has been demonstrated by the work of previous investigators that the diathermy current tends to concentrate along the path of lowest resistance, that diathermy currents pass through and produce heat within living animal tissues as well as within inanimate material, such as colloid saline masses, or dead animal tissues. It has also been shown that within a homogeneous medium, heat production is greatest near the electrodes, and that if the latter are of unequal size, heat production is greatest near the smaller electrode. In media which are not homogeneous in density and electrical resistance, the heat production may have correspondingly varied distribution, so that the highest temperatures may occur in the central portion of the mass, or elsewhere. In the living animal the heat gradient of the body is reversed during diathermy and heating occurs from without inward, the efficiency of the local blood circulation being a factor of primary importance in determining to what extent the heat produced in a given region will remain localized there and to what extent it will be disseminated throughout the body (Binger and Christie).

Our experiments consisted of making measurements, by means of thermocouples, of the temperatures during the flow of diathermy currents (of three different intensities) in the orbit, the conjunctiva, and two different regions of the interior of the eye in narcotized dogs.

In making these measurements spe-

cial precautions were taken to avoid electrical effects on the thermocouple by placing the long axis of the latter at right angles to the electrical field along an isopotential surface, and by checking the rate of galvanometer deflection at intervals during an experiment, so as to insure the accuracy of the temperature readings.

Our results indicate that by means of diathermy currents of intensities which appear to be within the limits of safe* clinical application, it is possible (in the dog) to produce in the orbit, temperatures as high as 40.69°C. (average maximum elevation of 4.49°C.); in the cavum oculi, temperatures as high as 43.18°C. (average maximum elevation of 6.98°C.); in the anterior chamber, temperatures as high as 42.74°C. (average maximum elevation of 6.54°C.), and in the conjunctiva, temperatures as high as 43.31°C. (average maximum elevation of 7.11°C.). These temperatures were attained in the living animal in the presence of the cooling effects of the blood circulation, of conduction, and of radiation.

In the analysis and interpretation of these results we find nothing to conflict with the conclusions of previous investigators, as set forth above.

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* This statement refers only to immediate observations, since in these investigations, each dog was killed upon completion of the experiments for which it was used. In order to obtain more conclusive data on this point it would be necessary to use aseptic technic in the experiments and to keep each dog alive for some days afterward in order to observe any late effects which might be produced in the lids or anterior segment of the eye.

References

- ¹ Binger, Carl A. L., and Christie, Ronald V. General and local heat developed in living animal body by passage of high frequency currents. *Proc. Soc. Exper. Biol. and Med.*, 1927, v. 24, pp. 677-683.
- An experimental study of diathermy. *Jour. Exper. Med.*, 1927, v. 46, no. 4, pp. 585-600. no. 5, pp. 715-734.
- ² Pariseau, Leo E. Diathermy. A critique and an experimental study. *Canad. Med. Assoc. Jour.*, 1929, February, v. 20, pp. 146-152.
- ³ Bordier, R. Diathermie et diathermotherapie. Bailliere, Paris, 1927.
- ⁴ Bettman, R. B., and Crohn, N. N. Diathermy in the production of deep temperature. *Jour. Amer. Med. Assoc.*, 1927, February, v. 88, pp. 532-537.
- ⁵ Hemingway, Allan. Thermal effects of diathermy. *Radiology*, 1930, February, v. 14, p. 99.
- ⁶ Howe, Lucien. On the coefficient of thermal conductivity of eye and orbit (Measured with cold applications). *Trans. Sect. Ophth. Amer. Med. Assoc.*, 1920, p. 113.
- The coefficient of thermal conductivity of eye and orbit. *Jour. Amer. Med. Assoc.*, 1922, September, v. 79, pp. 936-939.
- ⁷ Hollender, A. R., and Cottle, M. H. Diathermic studies on the eye and ear. *Arch. Otol.*, 1926, May, v. 3, pp. 438-443.

NEGATIVE INOCULATION WITH BACTERIUM GRANULOSIS

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Repeated attempts to inoculate the conjunctivæ of a blind volunteer, aged 49 years, with strains of *B. granulosis*, obtained from many sources, were uniformly negative. Control inoculations of a *M. rhesus* monkey made at the same time were also negative. It was considered probable that the bacteria had lost their virulence from repeated culture. From the Department of Ophthalmology and Bacteriology, University of Colorado School of Medicine.

Several investigators have already expressed the opinion that the question of the etiologic relationship of *Bacterium granulosis* to trachoma can be solved only by inoculation of the human conjunctiva. A number of such inoculations have already been reported. One of these made by Addario¹ in Palermo, was positive and when observed in January, 1931, by one of us (F.I.P.) presented a typical trachoma III. Two inoculations have been performed in this country by us². One of these was made on a person having healed trachoma and resulted in a severe follicular reaction having the characteristics of incipient trachoma, but cleared in forty days under treatment with protargol and copper sulphate. The second inoculation made on a normal subject resulted in a marked conjunctivitis with follicles which healed spontaneously without treatment. Two other cases reported by Wilson³ developed severe conjunctival inflammations without follicles and also cleared spontaneously. A rather large number of other inoculations reported by various investigators have been entirely negative.

The following case may be considered of interest mainly because of the large number of strains used in the inoculation. A blind volunteer, aged 49 years, having bilateral optic atrophy of luetic origin, was inoculated in the left eye on May 21, 1931. The conjunctiva of this eye showed a mild chronic catarrhal conjunctivitis but no scars or other evidence of a previous trachomatous infection. The first strain used was obtained at the Albuquerque Indian School from a boy having trachoma III with pannus. This strain gave typical biological reactions and was agglutinated by a specific *B. gran-*

ulosis anti-serum. Inoculation was made by instillation of cultures in leptospira medium into the conjunctival sac followed by moderate massage of the epithelium with a cotton applicator. This was repeated twice daily for three days. A single control inoculation was made by subconjunctival injection of the culture in both eyes of a normal *Macacus rhesus* monkey. Aside from a slight temporary traumatic reaction, no lesions occurred in either man or animal during an observation period of four weeks.

On June 18 a second and similar inoculation was made with pooled suspensions in leptospira medium of ten different strains of *Bacterium granulosis*. Six of these strains had been previously isolated by us from cases of trachoma in Colorado and New Mexico while of the other four, three were obtained from the Rockefeller Institute and one from Weiss in St. Louis. On June 21 suspensions of these strains obtained from blood agar slants were mixed with testicular extract in an attempt to enhance the virulence according to the method described by Pijoan⁴ and others. This mixture was used for six inoculations made at twelve hour intervals. At the same time a single subconjunctival control injection was made in a second normal *Macacus rhesus*. As before, only slight traumatic reactions occurred in both instances.

On July 15 a third inoculation was made with pooled cultures of three strains which had been obtained from experimental granular conjunctivitis in monkeys and a fourth strain obtained by Tyler at the Rockefeller Institute from a mixed culture originally isolated by Lumbruso in Tunis. The conjunctiva at the time of inoculation was

scarified with a platinum spatula until light bleeding occurred. Inoculation was repeated twice daily for three days as before. A third normal *Macacus rhesus* was inoculated with the pooled culture for control. Again neither man nor monkey showed signs of reaction other than those which could be expected from the traumatism involved.

Several factors are present which make difficult the proper interpretation of experimental inoculations with *Bacterium granulosis*. Of these the most important is undoubtedly the matter of virulence. Monkey experiments have rather conclusively shown that *Bacterium granulosis* loses virulence rapidly after isolation and in our experience infection has not been obtained with old strains. We have previously

mentioned the difficulty of producing first infection in monkeys with *Bacterium granulosis* and the relative ease with which the condition can then be transferred to normal monkeys by tissue or secretions. It seems to us that future inoculations should be conducted with strict attention to the problem of virulence. As monkey tissue appears to be uniformly virulent it might seem that this medium would fulfill the desired requirements. However, the use of tissue introduces a number of complications which might affect the validity of the experiment. It is probable that the problem will have to be settled by inoculations with recent strains which produce definite lesions in control monkeys.

References

- ¹Addario, C. *Ann. di Ottal. e Clin. Ocul.*, 1930, v. 58, p. 1074.
- ²Proctor, F. I., Richards, P., Greenfield, M., Finnoff, W. C., and Thygeson, P. *Amer. Jour. Ophth.*, 1931, v. 14, p. 318.
- ³Wilson, R. P. *Brit. Jour. Ophth.*, 1931, v. 15, p. 433.
- ⁴Pijoan, M. *Jour. Exper. Med.*, 1931, v. 53, p. 37.

TRIBROMETHANOL (AVERTIN) AS AN ANESTHETIC IN EYE SURGERY

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The advantages of avertin anesthesia in eye operations are presented. The eye is quiet, conjunctiva pale, and bleeding reduced. The extraocular muscles are relaxed. Intraocular tension is reduced, often very materially. The induction of anesthesia is considered ideal, requiring usually 15 to 20 minutes after administration by rectum of 0.1 mg. per kilogram of body weight. The post anesthetic period is usually quiet and free from nausea. No deaths have occurred in the author's series of 135 cases. Over-dosage, over-heating of the drug, and improper postoperative care are given as the causes of danger in use of the drug. From the Department of Ophthalmology, University of Wisconsin Medical School. Read before The State Medical Society of Wisconsin, Sept. 9, 1931.

A general anesthetic for eye surgery is rarely used for various reasons. First, many eye operations are satisfactorily performed by the instillation of local anesthetics such as cocaine, or, more recently, the injection of weak solutions of cocaine or novocaine into the conjunctiva, the muscles, or the lids. Second, the use of ether, chloroform, nitrous oxide, or ethylene by inhalation usually causes congestion of the tissues about the eye, coughing, or straining, and nausea and vomiting. In some eye operations this may produce no damage to the operated eye, but in intraocular operations a general anesthetic is at times followed by hemorrhage, breaking open of the wound, and subsequent loss of the eye. General anesthetics are, therefore, rarely if ever used. The hazards attending the use of a local anesthetic in a highly nervous or uncontrollable patient are well known to the ophthalmologist. The patient's dread of operation is almost universal and, therefore, any agent that can safely remove this and also largely eliminate the usual hazards of general anesthetics must prove welcome to those engaged in eye surgery.

The dangers of postoperative bronchopneumonia are always serious after ether, particularly in the aged, and this also is an important contraindication to the use of general anesthetics in many of our patients. During the past two years we have used avertin (tribromethanol) in the Department of Ophthalmology of the University of Wisconsin General Hospital when a general anesthetic was definitely indicated. More re-

cently, since our experience with the drug has increased, we have been using it routinely whenever there was doubt whether we would receive perfect co-operation from the patient.

The use of avertin as an anesthetic is increasing in popularity both in this country and abroad. Numerous articles regarding its use have appeared, especially from leading anesthetists. Waters and Muehlberger¹ have published one of the most comprehensive articles that has appeared in this country. Recently Dandy² published a brief paper in the *Journal of the American Medical Association* in which he highly praises its use in brain surgery and states he "has found no conditions that contraindicate avertin when a general anesthetic of fairly long duration is needed." Most authors report favorably concerning it and when properly administered it appears to be safe. Very few articles have appeared concerning its use in eye surgery. Dr. Wilmer³ presented the first paper in this country on its use in ophthalmology in June, 1930, at the meeting of the American Ophthalmological Society, in the discussion of which I gave a preliminary report of my experience with the drug. At the last meeting of the American Ophthalmological Society (June, 1931) I⁴ presented a paper concerning our experience with the drug at the University of Wisconsin Eye Clinic based upon the use of this anesthetic in something over 100 eye operations. Ninety case records were thoroughly reviewed and the findings tabulated. The ages of patients operated on varied from six

months to eighty-seven years. Those interested may refer to this communication for details concerning this series. Morgan and Lees⁵ of Guys Hospital, London, recently reported favorably on the use of the drug in fifty eye operations. Since my last communication we have performed an additional thirty-five eye operations under avertin anesthesia.

Operation under avertin

Operations upon the eye under any form of general anesthesia present various problems which need not be enumerated here. Under avertin anesthesia the eye is usually quiet and perfectly motionless. The tissues, particularly the conjunctiva, are paler than normal, and when anesthesia is profound, bleeding is much reduced if not entirely absent. At times the eye is rotated slightly upward though often its position is perfect, looking directly forward. The pupil is slightly contracted but reacts to light. There is a very noticeable reduction in the tone of the extraocular muscles, which is a part of the general relaxation in the muscular tone, so that fixation of the eye may be more difficult. It wobbles at times and double fixation may be necessary when making a cataract section. This is accomplished by an extra fixation below, which is held by the assistant or a suture may be used in the superior rectus to depress the globe slightly. Double fixation presents the disadvantage of two contacts with the globe, one of which the operator cannot control. Ewing's double fixation forceps may be used. After brief practice one grows accustomed to changes in technique necessitated by general anesthesia.

Intraocular tension is frequently much reduced. I first pointed out this observation in 1930 and have since confirmed the findings on numerous occasions. The tension was taken in forty-seven of our first series and in thirty-eight of these was found to have dropped from 2 to 60 mm., the average fall being 13 mm. There was no change in tension in five cases. A rise in tension in four cases was recorded, the elevation being from 2 to 13 mm. Those cases showing a rise in tension usually

had some respiratory embarrassment which generally produced a rise in blood pressure as well. The fall in intraocular tension occurred in eyes with normal tension as well as those in which the pressure was high. After making this observation we have tried the use of avertin in cases with high intraocular tension and have been able to reduce the tension from 60 mm. to 0. One striking case may be cited: J. K., a young adult, thirty-three years of age, had a bilateral congenital partial subluxation of both lenses. He had suffered a sudden luxation of the lens into the anterior chamber of one eye. The globe was very hard, tension 60, and the eye was much inflamed and tender. Under avertin, with preliminary morphine and scopolamine, the tension fell from 60 to 0; the tension of the fellow eye from 20 to 0. The usual section with Graefe knife was difficult due to the lowered tension. The lens was removed with a loupe with very little loss of vitreous. I believe this eye would have been lost under cocaine anesthesia alone, and very likely under ether, as well. The anesthetic proved efficacious in six other cases of glaucoma with moderate and high tension.

After I noted the lowering of the intraocular pressure in a number of cases, Dr. Seevers, of the Department of Pharmacology, undertook a series of experiments on rabbits and dogs, with a view to determining the change in intraocular and intracranial pressure after the administration of tribromethanol. A brief summary of these findings was given recently before the April meeting of the American Pharmacological Society in Montreal by Dr. Seevers.⁶ In a small series of experiments he found that a "3 percent aqueous solution of tribromethanol in anesthetic doses (0.35 gm. per kg.) intraperitoneally in the rabbit, produces a marked decrease in intraocular tension as measured either by direct canulization or tonometer. Morphine-scopolamine, paraldehyde, urethane, amytal in comparable doses, produced no significant drop. Venous pressure in the iliac and subclavian veins by direct method, intraocular and intracranial pressures by direct method,

are markedly diminished in the dog, following an anesthetic dose (0.15 gm. per kg.) intraperitoneally. Arterial pressure showed a less marked drop but pulse pressure was considerably diminished."

The lowering of intraocular pressure produced by avertin is probably dependent upon several factors. The most important, according to Seevers, is the lowering of systemic venous pressure as a result of peripheral dilatation of the blood vessels of the muscular and splanchnic areas, coupled with the very pronounced diminution of respiratory excursions. That the leveling out or diminution of respiratory excursions plays an important part through lowering of venous pressure is suggested by the work of Meyer and Middleton.⁷ They showed that increased muscular effort and altered respiratory function of the induction of ordinary inhalation anesthesia, such as nitrous oxide, ethylene, and ether, markedly increased venous pressure. The reverse conditions, namely, lessened muscular and respiratory effort prevails on inductions with avertin, thus lowering venous pressure. The work of Smith and Forbes⁸ concerning intraocular pressure also strongly suggests that the lowered venous pressure produced by avertin reduces intraocular pressure. They also state that "Thomas Henderson and Leonard Hill recorded intraocular and intracranial pressures simultaneously in seven experiments and that under all experimental conditions the pressures were identical and varied directly with the systemic venous pressure". We recorded venous pressure in three cases and in each instance it was lowered. The marked lowering of the tone of the recti muscles may also contribute to the reduction of intraocular pressure and is suggested by the experiments of Duke-Elder⁹ with other drugs.

The intraocular pressure seemed to vary greatly with the depth of the anesthesia, and often with the fall of blood pressure. When the patient was profoundly narcotized and the blood pressure low, intraocular pressure was also low. If breathing was in any way obstructed due to falling back of the

jaw, or if an air-way had not been introduced, the resulting anoxemia and respiratory embarrassment always caused a rise in blood pressure, and the intraocular pressure usually rose as well.

The lowered intraocular pressure after the globe is opened at first proved disconcerting. The globe at times becomes cadaver-like, it is so soft, with the cornea wrinkling or sinking inward after a cataract or keratome section. Slight pressure with a strabismus hook will usually aid in restoring sufficient tension to assist in extraction. The lens and vitreous body often appear to sink backward. This does not occur in all cases, however. It occurred in young adults as well as in the aged, though less frequently in the former. Delivery of the lens was always accomplished in the usual manner in uncomplicated cataracts. We have performed thirty-five cataract extractions under avertin anesthesia.

This anesthetic appears especially indicated in complicated cataract since loss of vitreous can be minimized. It proved excellent for acute or chronic glaucoma with high tension, enucleations, lid operations, extirpation of lacrymal sac, et cetera. Supplementary injections of adrenalin, however, are sometimes needed where the skin is incised. It is also satisfactory for squint operations in young subjects where local anesthesia with cocaine cannot be used. The lowered muscle tone affords easy access to a large section of muscle where resections are being performed.

One of the greatest advantages of avertin anesthesia is the elimination of the element of haste, particularly in cataract work, the young, inexperienced operator, especially the house surgeons and the younger assistants, approach an operation with less fear and trembling when avertin is employed. Ample time is provided for planning and execution of the operation. It is also a great comfort to know that there will be no squeezing or movement of the eye.

Administration

The drug is usually administered by rectum in a 3 percent normal salt solu-

tion at body temperature, the dose being 0.1 gm. per kg. of body weight (or $1\frac{1}{2}$ cc. of a 3 percent solution per pound of body weight) as recommended by the manufacturers. It is introduced with a large glass syringe fairly quickly through a fine French catheter. In a few instances intravenous injections were used, the doses being $1/3$ the rectal dose, but this method is satisfactory only for a very brief operation lasting no longer than five to ten minutes.

The anesthesia and the preoperative and postoperative care in all of our patients were supervised by Dr. Waters and his staff, to whom I am indebted for cooperation and advice.

Most of the patients received a preliminary sedative of morphine, gr. $1/6$, and scopolamine, gr. $1/150$, usually one and three-fourths hours preoperatively. About one-fourth of our cases received no preliminary sedatives. Children received small doses of morphine and infants were usually given no sedative. The preliminary sedative is important, especially in very strong, vigorous subjects, such as laborers with alcoholic tendencies, since avertin is not a profound anesthetic when used alone. Many anesthetists regard it as a basal anesthetic, supplementing it with nitrous oxide or other inhalation anesthesia. For eye work, when supplemented by local instillation of a few drops of cocaine, 4 percent, it has proven adequate without supplementary general anesthesia, in more than 70 percent of our cases. Nitrous oxide was required in some of our cases, especially for children who are less susceptible to avertin and so should receive somewhat larger doses.

A simple cleansing enema is given about three hours before operation. The injection of avertin into the rectum may be carried out in the patient's room, if desired, when the patient is unaware the anesthetic is being administered. Within five to fifteen minutes the patient falls into a deep, natural sleep, and usually is ready for operation within twenty minutes. There is no struggling, coughing, gagging, or any unpleasant sensation whatever. Usual-

ly the patient remains perfectly quiet and motionless throughout the operation. Our operations have varied from one minute to one hour and ten minutes, the average being twenty-nine minutes. The patient breathes very quietly, so much so that respirations are at times scarcely perceptible. The respiratory rate varies but little from normal, the average increase being only three per minute. Depression of respiration is perhaps the greatest hazard connected with the anesthetic, but the maintaining of a free airway usually accomplished by a metal airway, and the free use of oxygen throughout and after the operation largely eliminates this danger, as pointed out and stressed by Dr. Waters¹. This minimizes the danger of respiratory failure which has been recorded by various authors.

The blood pressure usually falls shortly after the administration and at times this decrease has been as much as 84 mm. of mercury. This fall, however, does not appear to affect the patient unfavorably. The average fall in our series was 17 mm. systolic. The color remains good, breathing continues regular and free, and at no time have we needed to administer any stimulation with adrenalin or ephedrine, which has been used by others. The blood pressure usually rises within a short time, approaching normal or remaining only moderately lower throughout the duration of the anesthesia, though it may remain low for some hours after operation.

Venous pressure, recorded in a few cases by the indirect method, showed a slight drop (2.8 points). The period of surgical narcosis is difficult to estimate accurately since the average duration of our operations was short (about thirty minutes). Using the first voluntary movement recorded by the attending nurse, the average period was four hours. The period of secondary sleep, however, varied from four to twenty hours. The majority of the patients slept well all night and had to be aroused the next morning (our patients were operated on in the early afternoon), but some were restless. This long period of sleep proved most ad-

vantageous, especially in cataract extractions, since the dreaded and restless first night after operation is often spent in quiet sleep. On the other hand this long period of narcosis and secondary sleep requires greater supervision and care by a trained nurse or attendant. Intravenous method varies considerably from the rectal method. The patient quickly falls into a deep sleep, often within one or two minutes, and remains so about fifteen to twenty minutes. They awaken or come out from the influence of the anesthetic almost as quickly as they go under, though they may afterward doze and feel sleepy for several hours. The very rapid induction and transitory action of the drug by this method makes it adaptable for only the briefest procedures.

Seventy-five percent of our cases had a very quiet awakening and 25 percent were classed as restless, many of the latter being among our earlier cases. Upon being awakened many of the patients demanded food. Very few were nauseated or vomited and most of those were young children who had received rather large doses of morphine before operation. Only six adults out of the ninety cases vomited and all of these had received sodium amytal by mouth before operation, and one an early morphine injection, postoperatively, which may have contributed to the vomiting. The vomiting recorded usually occurred on an average of nine hours postoperatively. Many of these attacks were very slight, the patient spitting up only a small amount. It is my impression that avertin, if used alone, rarely produces vomiting and it occurs infrequently even if morphine has been used as a preliminary sedative. It appears that the prolonged sleep following avertin administration carries the patient past the period of nausea which so frequently follows morphine administration, or it may in some way counteract this. This is important in cataract cases for whom we usually consider morphine positively contraindicated.

From the patient's point of view nothing could be more ideal than the use of avertin anesthesia. The induction

is perfect—there is complete amnesia of the entire procedure, and patients have been most enthusiastic in their praise of it.

We have noted no untoward effect, such as irritation of the bowel or hemorrhage, rectal casts, or kidney disturbances, with but one exception—a recent case—a man seventy-four years of age who had hematuria for a few days. He had shown shreds and a trace of albumin, however, before operation. In two of our early cases some respiratory embarrassment occurred in the ward, due to improper handling of the airways. Headache and abdominal disturbance occur at times. There were no deaths in our series.

The drug is not fool-proof by any means, as deaths have been recorded. With care, however, in preparation, careful administration, and postoperative supervision it appears that it is as safe as other general anesthetics. Much of the mortality has been due to overdosage, over-heating of the drug in preparation, and improper postoperative care. In every weak and emaciated subjects the dose should be reduced accordingly.

Naturally only an experienced anesthetist should administer the drug, but from my limited observation I can see no reason for any capable anesthetist failing to acquire the technic and experience quickly.

Modern anesthetists lay great stress on improvement of methods of induction, the allaying of fear, avoidance of struggle, coughing, gagging, vomiting, the excitement stage of ether, and other anesthetics. Tribromethanol with one stroke banishes all of these. To put it briefly, induction is practically perfect. The method of administration, namely the fine French catheter inserted in the rectum, a small amount of warm fluid, less irritating than water, followed by drowsiness and deep sleep within five to ten minutes appears nearer to an ideal than has yet been approached by any other general anesthetic.

Tribromethanol eliminates many of the disagreeable features and dangers attendant upon intraocular surgery. Those in charge of the large, free

clinics who must seek the cooperation, in a most hazardous and delicate procedure, of an ignorant foreign element, usually blind, often deaf, frequently stupid or stubborn, require no vivid picture to appreciate the potential value of avertin as an anesthetic in eye surgery. Nor does the surgeon who must operate on the timid, frail, nervous, anxious individual who is overly eager to cooper-

ate but utterly incapable of doing so, for tribromethanol speedily anesthetizes both types, and there are neither questions asked nor directions given. This picture may be overdrawn, but I believe ophthalmologists will welcome avertin as a valuable adjunct in certain types of cases, after giving it a fair trial.

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References

- ¹Waters, R. M., and Muehlberger, C. W. Tribromomethyl alcohol (avertin) anesthesia. *Surg. Gynec. Obst.*, 1930, Sept., v. 51, p. 361.
- ²Dandy, Walter E. Avertin anesthesia in neurologic surgery. *Jour. Amer. Med. Assoc.*, 1931, May, v. 96, no. 22.
- ³Wilmer, W. H. Avertin as an anesthetic in ophthalmic surgery. *Trans. Amer. Ophth. Soc.*, 1930, v. 28, p. 42.
- ⁴Davis, Fred'k A. Tribromomethanol (tribromomethyl-alcohol, avertin) as an anesthetic in eye surgery. *Trans. Amer. Ophth. Soc.*, 1931. (In print).
- ⁵Morgan, O. G., and Lees, J. M. Rectal narcosis in ophthalmic surgery. *Brit. Jour Ophth.*, 1930, v. 14, p. 577.
- ⁶Seevers, M. H., Waters, R. M., and Davis, F. A. The effect of tribromomethanol on venous, intraocular, and intracranial pressure. *Amer. Phar. Soc.*, Montreal meeting, 1931, April. (In print).
- ⁷Meyers, O. O., and Middleton, W. S. Venous pressure in anesthesia. *Jour. Clin. Investigation*, 1929, Dec. 20, v. 8, no. 1.
- ⁸Smith, F. F., and Forbes, H. S. Intraocular and intracranial pressure. *Arch. Neurol. and Psychiat.*, 1927, Oct., v. 18, no. 4, p. 550.
- ⁹Colle, J., Duke-Elder, P. M., and Duke-Elder, W. S. Studies on the intraocular pressure. *Jour. Physiol.*, 1931, v. 71, no. 1. (Cambridge University Press.)

DOUBLE PUNCTA AND DOUBLE CANALICULI OF THE UPPER LID*

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The literature is briefly reviewed and one case reported.

In 1929, N. Rosenblatt¹ reported six cases of double puncta of the lower lid and stated that Stock² cites only one case from the world literature. His cases may have been observed in the lower lid only because he noted that lid more carefully. That this condition has long been known is evidenced by the fact that von Graefe³ himself reported the first case.

A survey of the literature revealed that in 1901 Schoute^{4,5} gathered 22 cases of double puncta from the literature and reported a case of his own.

Of the 22 cases he reviewed, only three were found of the upper lid, all others being of the lower lid. Cosmetatos⁶ gathered an additional 18 cases, but from his report it is difficult to determine how many were of the upper and how many of the lower lid. He added a case of his own in which the double puncta were in the right upper lid and both canaliculi extended to the tear sac.

A survey of the literature from 1906 to date revealed comparatively few case reports of this condition.

C. Majewski⁷ reported in detail a case with four puncta and canaliculi in a lower lid of a forty-five year old woman.

In June, 1914, Greeves⁸ showed a case before the Ophthalmic Section of the Royal Society of Medicine in London. This case was very unusual in that it had four puncta.

Hertz⁹ in 1920, reported one case.

In 1922, B. Chase¹⁰ reported a case of a woman with double puncta in the lower lid having no connection with the tear sac.

In 1930, C. Iolfe¹¹ reported two cases of the lower lids. Most of the reported cases are brief and it is not possible to

ascertain whether the puncta alone were doubled, or whether the canaliculi too were doubled.

That these cases are not common is shown by Kleczkowski¹² who found only two cases of tear passage anomalies in 120,000 cases.

Rosenblatt believes that they are more common than is ordinarily assumed because he found his six cases among 100,000 patients. Since finding the case reported, I have examined all cases for anomalies of the tear passage and have found only one case of congenital absence of a lower punctum in approximately 6,000 cases.

Since several ophthalmologists of wide experience who were shown this case had never previously seen one, I thought it interesting enough to report.

Mrs. H. R., aged thirty-three years, on March 9, 1931, complained of slight redness and burning of the left eye, slight tearing but no epiphora, secretion or photophobia. She had a 5 mm. violaceous, slightly elevated, diffuse injection in the anterior nasal sclera from "8 to 11 o'clock" which blanched easily on pressure. The adjacent cornea was uninvolved. The cornea, anterior chamber, iris, media, and fundus were normal. Refraction under atropine: O.D. +3.00 D.sph. = +.25 cyl. ax. 9°, vision 15/10-2; O.S. + 3.00 D.sph. = +.87 cyl. ax. 95°, vision 12/10+3. The anterior choroid was entirely normal, as were both fundi. There were no phorias.

The left upper lid contained two puncta. The larger one was 1 mm. temporal to the normal position and the smaller one was 1 mm. nasal to the normal position. The lid rode normally over the globe. The conjunctiva was cocaineized and an attempt made to probe the puncta, but no dilator or probe was small enough to be introduced. The patient fainted and the probing was delayed until the subse-

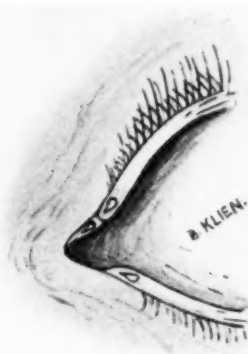
*From the Department of Ophthalmology, University of Chicago.

quent visit on June 30, 1931. On that date the redness had disappeared and the globe was normal on slitlamp examination. The conjunctiva was again cocaineized and fine hairpins sterilized and introduced into both puncta. The hairpins were carried nasally to the position of the sac, but there met with obstruction. There was no connection between the canaliculi at any point and both extended nasally the same distance. The hairpins seemed to parallel each other. The openings could not be sufficiently dilated to introduce the tip of a lacrymal syringe so the connection with the sac was not definitely established.

The accompanying sketch shows the relative positions of the two puncta on the upper lid border.

Rosenblatt classifies these anomalies into four divisions; 1. Dot-like, flat, not definitely vertical and located near the normal position. 2. Fine, slit-like. 3. A

fine groove running temporal-ward. 4. Dot-form in a crater of the normal lacrymal canal.



(Bothman). Double puncta and double canaliculi of the upper lid.

The above case falls into the third group of his classification.

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References

- ¹ Rosenblatt, N. *Zeit. f. Augenh.*, 1929, v. 70, p. 298.
- ² Stock. *Graefe-Saemisch Handbuch der Augenh.*, v. 9, no. 15, p. 166.
- ³ von Graefe. *Arch. f. Augenh.*, v. 1, p. 288.
- ⁴ Schoute. *Nederl. tijdschr., v. geneesk.* v. 2, p. 432.
- ⁵ ———. *Arch. d'Ophth.*, v. 21, p. 321.
- ⁶ Cosmettatos. *Arch. f. Augenh.*, 1906, v. 55, p. 362.
- ⁷ Majewski, C. *Arch. f. Augenh.*, 1912, v. 70, p. 349.
- ⁸ Greeves. *Klin. M. f. Augenh.*, v. 53, p. 251.
- ⁹ Hertz. *Tr. of the Copenhagen Soc.*, 1920-21, p. 19.
- ¹⁰ Chase, B. *Amer. Jour. Ophth.*, v. 5, p. 297.
- ¹¹ Iolfe, C. *Russk. Oftalm.*, no. 11, p. 101.
- ¹² Kleczkowski. *Postep Okulistyczny*, 1908, no. 11.

STUDIES IN OCULAR FATIGUE

III. Fatigue of Accommodation History, Apparatus, and Methods of Graphic Study

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Ocular fatigue has been generally ascribed to the accommodative muscular system since Donder's work in 1864 but no experimental investigation of fatigue of accommodation has been made until comparatively recently. The ergograph was first adapted to this study by Howe. Several modifications of Howe's instrument have been constructed and are briefly described. The two methods of testing accommodation generally used may be called the sustained effort test and the repeated effort test. The later accommodation ergographs provide accurate control of rest periods, rate of approach and recession of test object, constant illumination, and simplification of the mechanical work of the subject. From the Department of Physiology, Columbia University. Read before the International Congress of Ophthalmology, Amsterdam and The Hague, September 5-13, 1929, published in part in the Transactions of the Congress.

Fatigue of accommodation, a condition frequently encountered in the practice of ophthalmology, has so far received little scientific attention. The object of this paper is to stimulate interest in its study by graphic methods under controlled conditions.

Many points in the problem of fatigue of striated muscle are still unsettled and even less is known in regard to fatigue of nonstriated muscle. The exact mechanism of accommodation has not been determined and the probability of fatiguing accommodation is doubted by certain authorities, therefore, the problem presents so many difficulties that this paper should be considered as introductory.

Asthenopia was believed by von Graefe¹ to be due to weakness of the internal recti muscles, but Donders² in 1864 said, "It will have been evident to the reader that the phenomenon of asthenopia proceeds from nothing else than from fatigue of the muscular system of accommodation. In what this fatigue consists, deserves to be more closely examined."

Bonnet³ and Petréquin⁴ were the first to exclude the retina as the cause of asthenopia and to seek the primary cause in the neuromuscular mechanism of the eye, particularly in accommodation. The use of convex lenses for the cure of asthenopia was recommended by Boehm⁵ who inferred that it was more likely to be produced by fatigue of accommodation than by

retinal fatigue, since motor nerves are more susceptible to fatigue than sensory nerves.

In spite of the differing opinions of early ophthalmologists regarding the cause of asthenopia, experimental investigation of fatigue of accommodation has been comparatively recent.

Ferree⁶ in 1913 described his test for studying the efficiency of the eye. Essentially, this method consists in observing the letters "li" on a white card, set at a distance within the punctum remotum, for a period of three minutes and recording, during this time, the intervals of blurred and clear vision. The test is given before and after periods of ocular work and the two sets of results are compared. Ferree maintains that increase in the time that the test object is blurred after use of the eyes "may be ascribed practically entirely to changes in the muscular control of the refracting mechanism".

In 1914, Lancaster and Williams⁷ published the results of an extensive study on accommodation. Most of their subjects showed no evidence of accommodative fatigue with the following experiments:

"1. Reading fine print at or near the punctum proximum for various periods up to one hour; punctum proximum and punctum remotum taken before and after; punctum proximum taken at frequent intervals during the test but punctum remotum not taken during the test, since that would allow the ciliary

muscle to relax while it was being tested; muscle balance and 'strength' taken before and after.

"2. Focussing small test object and keeping it as near the eye as possible without blur (or it was kept just a little nearer than the true punctum proximum so as to stimulate the eye constantly to make it clear by stronger accommodation), record taken every ten seconds of its distance, tests lasting one, five, ten and twelve minutes and longer up to an hour.

"3. Fixing a test object placed nearer the eye than the punctum proximum, time taken until it became clear.

"4. Fixing and focussing test object which was moved rhythmically forward and backward over the range of accommodation from punctum remotum to punctum proximum and back ten or twelve times a minute; punctum proximum and punctum remotum and muscle balance taken before and after the tests."

According to the authors, the punctum proximum was brought nearer in the first two tests and remained practically unchanged in the last, and the punctum remotum advanced in all the tests. Figure 1 shows one curve obtained by method 2, in which there is a slight falling off in the power to accommodate after about one-half hour of continuous fixation.

This is interpreted as fatigue. Lancaster and Williams maintain that the element of fatigue considered as accommodative in Ferree's test is in reality retinal fatigue.

It was the inspiration of Howe⁸ to adapt Mosso's ergographic method of studying fatigue of striated muscle to the study of fatigue of the ocular muscles. His first ophthalmic ergograph, described in 1912, recorded fatigue of convergence, and his second, in 1916, fatigue of accommodation⁹. At the time of his death in 1928, he was perfecting another ophthalmic ergograph. His original instrument for recording fatigue of accommodation (Fig. 2) was a horizontal bar upon which was mounted a sliding carrier which held the test object. One end of a violin string was

attached to this carrier and the other end to a pen which recorded on a smoked drum, as the test object was brought to and from the punctum proximum. Curves which Howe obtained (Fig. 3) with this ergograph closely resemble the classic fatigue curves of muscle as depicted by Mosso and are at variance with the results of Lancaster and Williams who expected to ob-

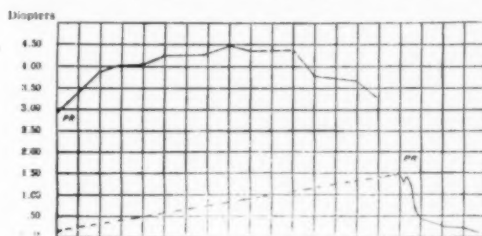


Fig. 1. Curve showing slight evidence of accommodation fatigue, obtained by Lancaster and Williams.

Observations made every 10 seconds, but this chart platted from observations every 3 minutes, intermediate observations omitted. Each vertical space equals 0.50 D, each horizontal space equals 3 minutes.

—Curve of punctum proximum, continuous fixation of test object as near as possible for forty-five minutes, followed immediately by the curve of punctum remotum, continuous fixation of the test object as far off as possible, wearing a +2.00 D. lens. Note the characteristic increase in power to accommodate, followed in this case by a definite falling off after about half an hour—fatigue. The broken line shows how the punctum remotum comes nearer during the very strong accommodation—contracture or spasm. It is followed by the curve showing recovery during the following fifteen minutes, the punctum remotum gradually returning to normal.

tain the same results Mosso did in studying fatigue of striated muscle. Howe¹⁰ classified two main types of fatigue of accommodation as follows:

A. The strong type

1. Strong throughout the entire effort.
2. Strong through the first and second portions but not in the third.
3. Strong contractions in the first part only.

B. The weak type

1. Contractions not above normal in the first and second portions, but distinctly weak in the third.
2. Contractions not above normal in the first but distinctly weak in the second and third.
3. Contractions below normal throughout.

There were no illustrations of the types described but Howe stated that the initial contractions generally constituted about one-eighth to one-fourth of all the contractions, the medial about one-half, and the terminal portion the remainder.

The curves we obtained in subjects with normal eyes using this instrument neither resembled the curves obtained by Howe nor the fatigue curves of

clinical tests^{12, 13, 14}. The first was a combined instrument (Fig. 4) with which tests of fatigue of convergence or of accommodation could be made, thus obviating the necessity of two instruments. The subject moved the test object and stopped it when the print became blurred.

A cord attached to the test-object carrier of combined ergograph No. 3 diminished the arm fatigue, and mouth-

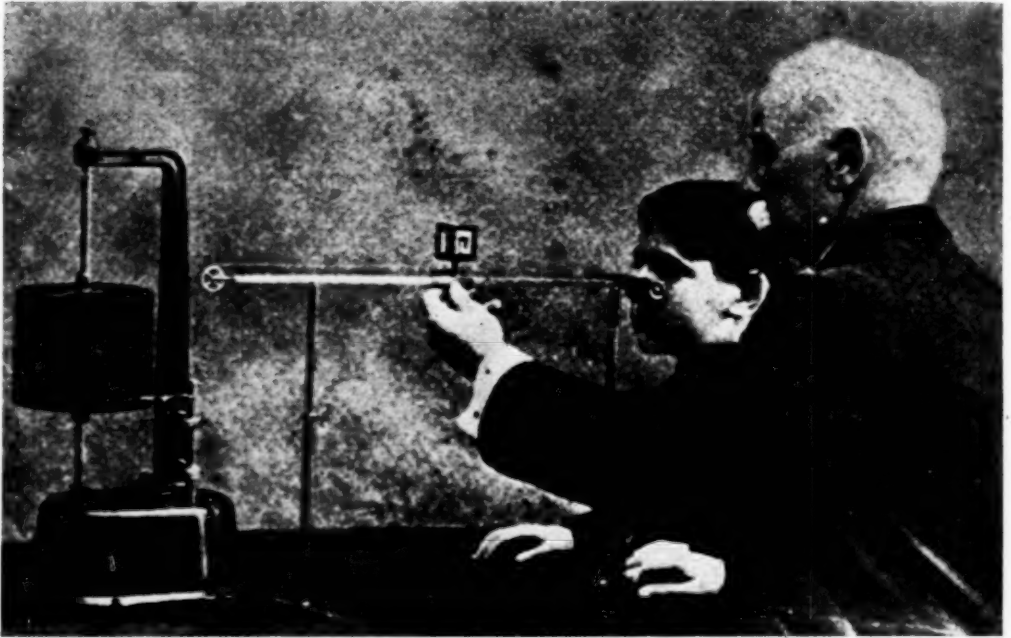


Fig. 2. The first accommodation ergograph (Howe). Test object activated by experimenter. Record drawn in plain view of subject and experimenter. Head not securely fixed and apparatus unsteady. Rest periods, illumination, and length of excursion of text object not standardized.

striated muscle as pictured by Mosso.

Use of the original Howe ergograph for studying the effects of low oxygen tension¹¹ revealed the necessity of modifying the technic so that the subject and not the experimenter activated the test object. When this was done, fatigue of the striated muscle of the arm occurred before fatigue of the ciliary muscle. This handicap was not overcome in the second model.

In the past eleven years six other ophthalmic ergographs have been constructed, each one designed to eliminate defects found in the apparatus after

bite fixation insured greater steadiness of the head (Fig. 5).

More rigid construction of the fourth accommodation ergograph (Figs. 6 and 7) eliminated vibration of the test object. Shielding the kymograph from the subject excluded a distracting element and prevented any tendency of the subject to be influenced by his performance.

The elimination of prisms in the study of fatigue of convergence simplified combined ergograph No. 5 (Fig. 8) and arm fatigue was further reduced by placing the mechanism for controlling

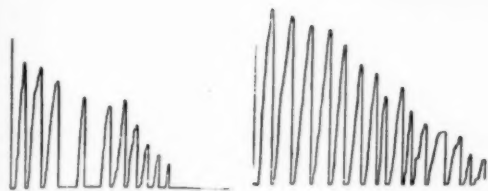


Fig. 3. Two records of fatigue of accommodation in normal eyes (Howe).

the test object in a more favorable position.

Erograph No. 6 (Fig. 9) has been used in our office practice for the past three years and the majority of the records have been made with it. The advantages of this instrument include: a mouth-bite fixation, automatic control of the forward movement of the test object by means of a fan governor, adjustable height of test object, motor-driven kymograph using white paper from a roll and a recording pen (thus affording records of any desired length) and a lever which stops the forward motion of the carriage and returns it to the base line position. The latter is operated by the subject. The defects of the instrument are: (1) the rest periods between excursions can not be satisfactorily controlled; (2) illumination is not constant; (3) the

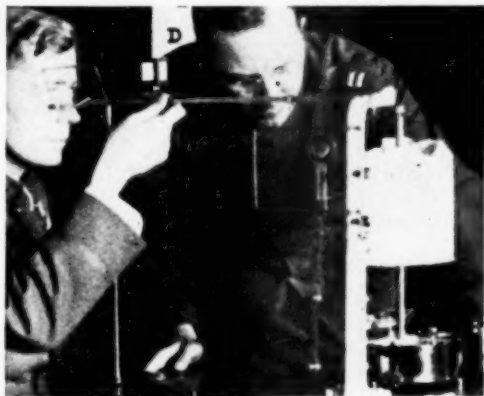


Fig. 4. Ergograph No. 2. Combined instrument for studying fatigue of accommodation and convergence. Test object activated by subject. Instrument more rigidly constructed than first ergograph but head rest allowed so much play that records were inaccurate. Fatigue of arm before fatigue of accommodation.

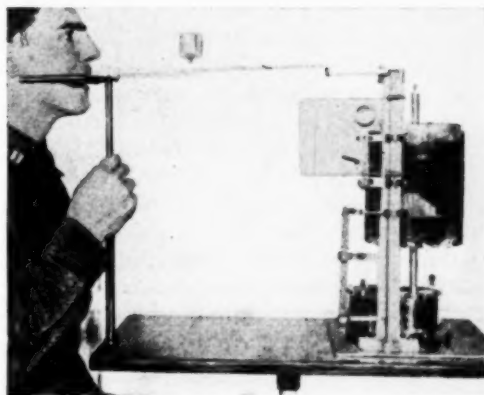


Fig. 5. Ergograph No. 3. Combined ergograph with bite fixation and improved method of activating test object. Speed of recession and approach, rest period, amount of relaxation, and illumination not yet considered.

long rod permits slight vibration of the test object, and (4) the mechanical control of the test object requires too great concentration on the part of the subject.

With ergograph No. 7 (Fig. 10) the

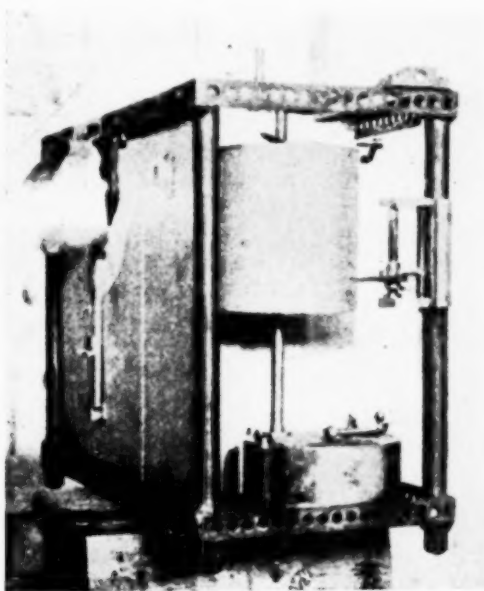


Fig. 6. Ergograph No. 4. Combined ergograph designed to record graphically, fatigue of convergence, divergence, supravergence, and monocular and binocular accommodation. Record screened from subject. Vibration diminished.

rest period, which can be varied from one-half to seven seconds, the rate of approach of the test object, which can be varied from two to four centimeters per second, and its return to the base line position are automatically controlled. The task set for the subject is consequently much simplified. Vibration of the test object has been overcome and constant illumination is also provided. This instrument has recently

use in the low-oxygen tension experiments and when using the ophthalmic ergograph, since the subject can change his gaze rapidly from one letter to another. This diminishes the factor of retinal fatigue which is considered of greater importance than the slight loss of accuracy in determining the near point, which in astigmatism, as shown by Lee¹⁶, would probably be greater with the Duane line.

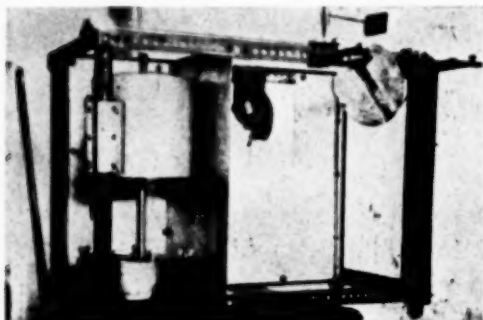


Fig. 7. Ergograph No. 4.

been completed and described^{11a} but few clinical records have been made with it.

In studying accommodation, results depend to a large extent upon the kind of test object used. Preliminary work done to determine the best test objects for studying accommodation under low-oxygen tension also applied to the ophthalmic ergograph.

The types of test objects used in studying 25 subjects, making two separate tests of each subject, and the average error found, in millimeters, are as follows:

- | | |
|---|-----------|
| 1. Duane's ¹⁸ test object..... | 3.75 mm. |
| Black line 3.0 x 0.2 mm. on | |
| white card 4 x 1.25 mm. on | |
| black velvet disc | |
| 2. Letters* | 4.5 mm. |
| 3. Numbers* | 5.5 mm. |
| 4. Illiterate E* | 4.5 mm. |
| 5. Radiating squares* | 14.25 mm. |

It is possible that the Duane line is the best test object for accurately determining the near point of accommodation in intelligent patients, but the illiterate "E" and letters are better for

* Plates made by E. B. Meyrowitz, New York, N.Y.

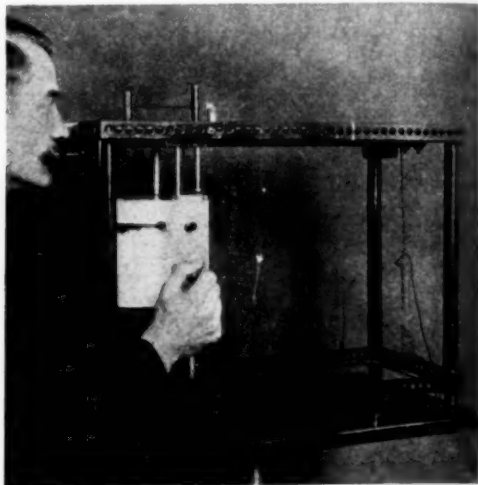


Fig. 8. Ergograph No. 5. Simple form of combined ophthalmic ergograph designed to test fatigue of accommodation and convergence at the near point. Prisms not used.

In order that the type may be as sharply defined as possible one may take advantage of photographic reduction. A photographically reduced illiterate "E" chart constructed on the Snellen principle is inexpensive and practical.

Outline of methods of studying fatigue of accommodation

The two general methods of testing accommodation fatigue with the ophthalmic ergograph may be called the sustained effort test and the repeated effort test. Each of these methods allows several variations in technique.

In the sustained effort test, the test object is kept as close to the eye (or eyes) as possible without blurring. The test may be made with or without cor-

rection, or with plus or minus spheres added to bring the initial punctum proximum to any desired distance, for example, 250 mm.

In the repeated effort test, the test object is brought alternately to and from the punctum proximum. As none of the ergographs have been constructed to allow complete relaxation of

In the first variation, neither the number of excursions per minute nor the rest periods are standardized; in the second, the rest periods between efforts are unequal, that is, a short excursion, denoting a poorly sustained accommodative effort, permits a longer rest period between trials than a long excursion. When the rest period is kept

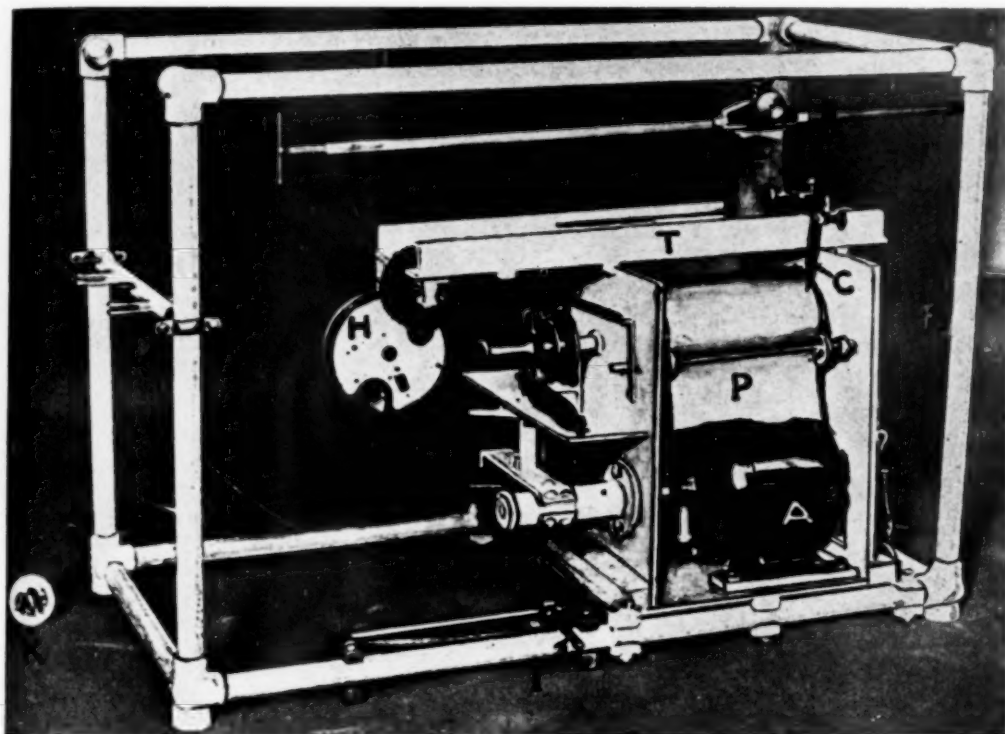


Fig. 9. Accommodation Ergograph No. 6. Test object carried forward by spring with fan governors to regulate speed of approach. Number of efforts per minute controlled by metronome. By this method subject, making weakest effort, obtained longest rest period. Recording method greatly improved by dispensing with smoked drum. Record made with stylographic pen on continuous roll of white paper activated by standard motor.

the ciliary muscle, the so-called repeated effort test requires partially sustained effort. The distance of the excursion may be varied, although this is limited by the length of the track on which the test object moves and by the individual punctum proximum. The efforts may be repeated as rapidly as possible, they may be restricted to a given number per minute, or the interval between efforts may be kept constant.

constant, the number of efforts per minute cannot be standardized. A further variation of the repeated effort test may be made by using plus or minus spheres as suggested under the sustained effort test.

With an appropriate test object and a Prince rule notched to fit over the bridge of the nose, the above tests may be approximated by the ophthalmologist in the course of his daily practice. He will not have the advantage of an

automatic graphic record, or the refinements in technique, but information, valuable in differential diagnosis, may sometimes be obtained.

In making a repeated effort test of fatigue of accommodation with the sixth accommodation ergograph, the following technique is used: The instrument is first adjusted to the proper height for the mouth-bite fixation, and the test object raised or lowered until it is on a level with the subject's eyes.

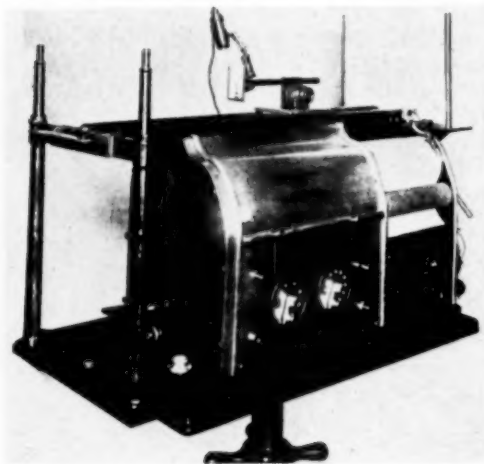


Fig. 10. Accommodation Convergence Ergograph No. 7. Rest period during relaxation controlled by timing device. Test object and paper for recording activated by one motor. Vibration eliminated. Illumination standardized.

Before beginning the test, ten readings of the near point of accommodation in millimeters from the cornea are made and averaged. The test object is then set at the base line 20 millimeters back of average near point to allow that much amplitude of excursion. In patients with very weak accommodative power it is sometimes necessary to permit a 30 mm. excursion. The number of approaches per minute is controlled by a signal bell from a metronome which rings fifteen times a minute. When the bell rings, the subject pushes the control lever away from him, watches the test object, and as soon as it becomes blurred, pulls the lever back and holds it until the next signal bell. This procedure is repeated for ten or

fifteen minutes or even longer, unless constant blurring of the test object occurs in less time.

The preliminary procedure for the sustained effort test is the same as for the repeated effort test. The technique is as follows: By means of the lever in his right hand the subject keeps the test object as near his eyes as possible without blurring. The position of the test object is automatically recorded on the kymograph as in the repeated effort test, but the record consists of a single line contour.

Summary. The first five accommodation ergographs had no method of accurately controlling rest periods, and patients with insufficient accommodation obtained a longer rest between efforts than those whose accommodation was strong. Illumination was also unstandardized and vibration of the test object was a disturbing influence. Vibration of the entire machine because of the motor drive also constituted an annoying factor. In Howe's accommodation ergograph the examiner wrote the record of fatigue as he moved the test object. The results obtained by this method in supposedly normal subjects were much like the fatigue curves of striated muscle obtained by Mosso. We have not been able to duplicate these curves except in patients whose accommodation was definitely subnormal.

The sixth accommodation ergograph automatically controls many of the variable factors and eliminates some of the distracting influences which interfered with studies of fatigue of accommodation. This makes it possible to obtain records which are more nearly comparable.

The two methods which have proved most useful in studying fatigue of accommodation both with and without apparatus for making graphic records, are the sustained and repeated effort tests. In the sustained effort test the test object is kept as close to one or both eyes as possible. In the repeated effort test, the test object is repeatedly brought to the near point, the amount of recession and the length of the rest

periods or the number of excursions per minute are controlled. The test object must be sharply defined and should subtend a known visual angle at a given distance. Type smaller than 200 mm. is impractical and in ergographic work there should be several letters which subtend the same visual angle so that the factor of retinal fatigue may be minimized. Although the Duane line is accurate for determining the near point of accommodation it is not practical for ergograph work.

The seventh ophthalmic ergograph

automatically standardizes rest periods and the rate of approach and recession of the test object. Illumination of the test object is constant, vibration has been eliminated, and the mechanical work of the test simplified for the subject by controlling all movements of the test object by pressing a button.

35 East Seventieth street.

We are indebted to Mr. Stephen M. Balzer for constructing the seventh accommodation ergograph and for valuable suggestions in regard to mechanical details which have markedly improved the instrument.

References

- ¹ von Graefe, A. Arch. f. Ophth., v. 3, p. 308; v. 8, p. 314.
- ² Donders, F. C. On the anomalies of accommodation and refraction of the eye. London, 1864, p. 265.
- ³ Bonnet, M. Gaz. méd. de Paris, 1841, v. 9, p. 570.
- ⁴ Petréquin, J. E. Ann. d'Ocul., 1841, v. 5, p. 250; 1842, v. 6, p. 72.
- ⁵ Boehm, L. Das Schielen, Berlin, 1845, p. 17.
- ⁶ Ferree, C. E. Tests for the efficiency of the eye under different systems of illumination and a preliminary study of the causes of discomfort. Trans. Illum. Eng. Soc., 1913, January.
- ⁷ Lancaster, W. B. and Williams, E. R. New light on the theory of accommodation with practical applications. Trans. Amer. Acad. Ophth. and Oto-Laryng., 1914.
- ⁸ Howe, L. Fatigue of convergence and divergence, as registered by the ophthalmic ergograph. Trans. Sect. Ophth., Amer. Med. Assoc., 1912.
- ⁹ ———. The fatigue of accommodation, as registered by the ophthalmic ergograph. Jour. Amer. Med. Assoc., 1916, July 8.
- ¹⁰ ———. Registration of fatigue of accommodation. Trans. Amer. Ophth. Soc., 1917, v. 15, p. 145.
- ¹¹ Berens, C. The manual of the ophthalmologic department, manual of the medical research laboratory, Government Printing Office, Washington, 1918, p. 156.
- ¹² ———. An accommodation ergograph. Trans. Amer. Acad. Ophth. and Oto-Laryng., 1929, p. 472.
- ¹³ ———. Air service medical. Government Printing Office, Washington, 1919, p. 275.
- ¹⁴ ———. Hardy, L. H. and Pierce, H. F. Studies in ocular fatigue. Convergence. The ophthalmic ergograph: Its evolution and application to aviation. Contributions to ophthalmic science, Menasha, Wis., George Banta Pub. Co., 1926, p. 102.
- ¹⁵ ———. Hardy, L. H. and Pierce, H. F. Studies in ocular fatigue, II. Convergence fatigue in practice. Trans. Amer. Ophth. Soc., 1926, v. 24, p. 262.
- ¹⁶ Duane, A. A standard test object for determining the near point of accommodation. Ophth. Record, 1909.
- ¹⁷ Lee, T. P. A simple apparatus for determining the near point of accommodation and the astigmatic axis. Arch. of Ophth., 1927, v. 56, p. 351.

THE FATE OF FOREIGN BODIES WHICH REMAIN INSIDE THE EYE

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BUDAPEST

(TRANSLATED BY DR. W. H. CRISP)

Three cases are reported in which metallic foreign bodies were retained from five to eighteen years. Two eyes kept useful vision. In the third case a shrunken globe was removed because of inflammatory symptoms and histological examination showed recent suppurative process due to the presence of the foreign body.

Rachmann, ophthalmologist in Essen, the largest center of the iron industry in Germany, prepared statistics covering a period of sixteen years, and found eighty-five cases in which a splinter of iron was definitely known to have penetrated to the interior of the eye. Of these patients, thirty-six came immediately, thirteen one day, seven two days after the injury, the others only after weeks, months, or even one or two years. One came as late as eight years after the injury. Magnet extraction was successful in 90.5 percent of the cases in the Essen eye clinic, that is to say the splinter of iron could be removed, but the end results depended upon what part of the eyeball had been injured and in what manner.

The percentage of cured cases in the Essen statistics was 9.4 percent, in contrast with Hirschberg, who among three hundred magnet operations was able to record only 3.3 percent of complete cures. It is to be understood that in Hirschberg's time the technique of localization, roentgen diagnosis as applied to this particular problem, had not reached so high a level of development. The examination with the sideroscope was only a weak attempt at verification and localization of the iron splinter.

An iron splinter which has penetrated the retina or the vitreous acts as a pathological irritant. If infective material has also penetrated the eye, the clinical picture of suppurative panophthalmia soon develops, and leads to shrinking of the eyeball. But if the splinter is hot, so as to penetrate the ocular interior in a sterile condition and without injuring the lens, the foreign body may remain in the retina or vitreous for years and become encapsu-

lated, without the eye developing an inflammatory reaction. Cases have been described in which the encapsulated foreign body was first noticed years later and at that time had become dangerous to the other eye. Fuchs, for example, refers in his textbook to a case in which an iron splinter which had penetrated the eyeball gave rise to disturbance only after twenty years.

In this communication I should like to report some cases which I have had occasion to watch in this clinic for a number of years. At the meeting of the Hungarian Ophthalmological Society on October 29, 1926, I presented a case in which an iron splinter had passed through the cornea and iris and had come to rest in the lower temporal quadrant of the retina. With the Haab magnet the foreign body could be made to show movement, but could not be brought forward.

For months the eye remained unirritated, and a white wall of scar tissue developed around the foreign body. Since then the patient had often returned for observation, and the objective findings had undergone no change. A few months ago, that is four and a half years after the injury, I again examined the patient and was able to determine that the eye was free from irritation, the vitreous clear, vision 5/10, the defective visual field unaltered. The condition of the fundus had changed to the extent that most of the pigmentation had disappeared and only in the immediate vicinity of the foreign body did some proliferation of pigment remain. Recent roentgenography revealed that the foreign body still occupied its old location.

In another case, about three years ago, a piece of brass penetrated the

right eye of a workman thirty-three years of age. The foreign body entered the cornea at the nine o'clock position, the iris tissue remained adherent to the cornea through fibrinous bands, and the iris itself showed a tent-like bulging toward the cornea. In this bulging part of the iris one could see a small black body, embedded in the substance of the iris. The vision of the eye was 5/5. I tried to extract the foreign body from the iris with forceps, but the iris slipped out of the blades of the forceps and at this point a black hole appeared in the iris.

The roentgenograph showed in the lower posterior quadrant of the orbit an intense shadow about the size of a grain of millet. With the ophthalmoscope the optic disc and the fovea appeared normal, but downward and outward there was a retinal detachment about the size of the optic disc.

Some months ago I saw the patient again, and I found the eye free from irritation, a small flap of iris adherent to the corneal wound, a small hole in the iris itself, a diffuse opacity in the periphery of the lens, fine floating opacities in the vitreous, an atrophic area about half the diameter of the optic disc in the lower outer part of the retina, and next to this a brownish area of similar size, containing the encapsulated foreign body. Vision was 5/15, corrected to 5/10 with 0.5 D.sph., visual field contracted about twenty or twenty-five degrees upward, outward and inward.

This case shows therefore that the eyeball itself may tolerate a splinter of brass for years. I could find no evidence of chalcosis of the eyeball or of the retina. This case also is to be regarded as supporting Rötth's contention that in extremely rare cases an intraocular splinter of copper or brass produces neither inflammation nor imbibition.

A third patient, a merchant twenty-nine years of age, came with the complaint that an iron splinter had entered his left eye eighteen years previously. The injury was followed by inflammation which led to shrinking of the eyeball, but after that the eyeball had remained free from irritation until this

time. For the past six days he had had an inflammation of this eye, lachrymation, headache on the left side of the head, and nausea.

Upon examination the right eye showed no pathological condition, and had vision of 5/5. The left orbit consisted of a hazelnut, with strongly injected and swollen conjunctiva, the tarsal conjunctiva of the lower lid chemotic to the extent that it protruded from the palpebral fissure. There was no light perception. There were severe pains in the shrunken eyeball.

Enucleation was undertaken the next day, and numerous scars were found in the retrobulbar tissue. The eyeball



Fig. 1 (Fejer). Macroscopic specimens.

was examined by Dr. E. Kovacs, prosector of our hospital. His findings were as follows: "Greatly shrunken eyeball, about the size of a small walnut, its largest diameter fourteen millimeters. Bisection disclosed that the shrunken eyeball was surrounded by a dense white fibrous scleral tissue, 0.5 mm. thick. The eye was filled with gray granulation tissue, in the center of which there was a yellowish-brown cavity about the size of a cherry stone. This contained a rather firmly embedded splinter of iron measuring 3 by 4 by 0.5 mm. Broadly speaking, the splinter was quadrangular in shape. The loose granulation tissue occupying the interior of the eye contained some abscesses about the size of poppy seeds, filled with pus celis. With the exception of the sclera the constituent parts of the eyeball could not be recognized. The changes were based upon chronic inflammatory shrinking of the eyeball, the latter containing circumscribed abscesses, due to the presence of a foreign body. In the vicinity of the ab-

scesses there was pyogenic infiltration."

Thus in addition to the old disturbance there was a recent inflammatory process. The photograph of the bisected eyeball, and the photomicrograph demonstrate these relationships unmistakably (Figs. 1, 2, and 3). Thus a foreign body which has penetrated to the interior of the eye may remain there for eighteen years, without the occurrence

Upon the basis of a communication by Knapp, and also as the result of his own experiences, this author came to the conclusion that it was by no means justifiable to take for granted that a foreign body which had penetrated the ocular interior and which at first had caused no irritative phenomena would behave in the same way throughout life. Bulson expressed the belief that

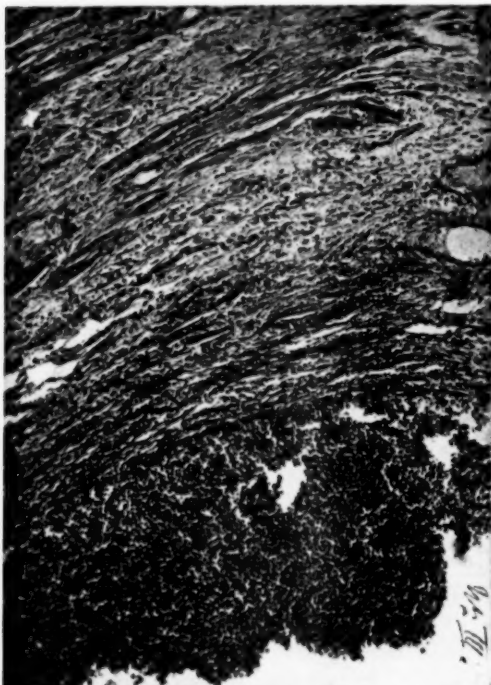


Fig. 2 (Fejer). Low power showing abscess formation.

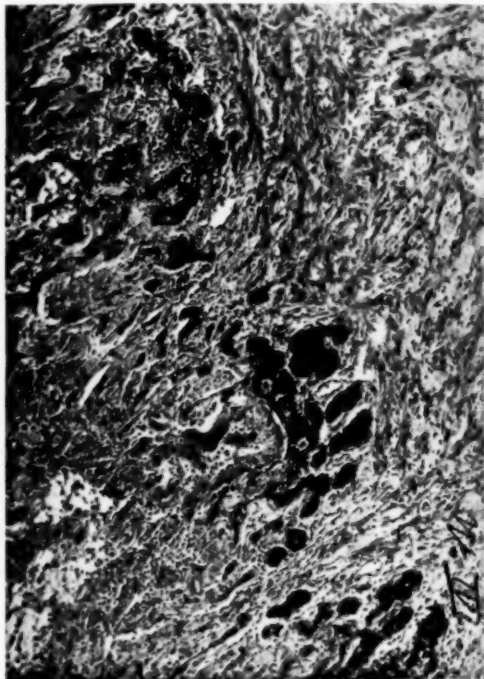


Fig. 3 (Fejer). High power of abscess with pyogenic infiltration.

of inflammatory phenomena. Although the foreign body produced a secondary chronic inflammation, it only occasioned pain when small abscesses had developed and exacerbation of the process occurred.

The clinical histories of the three cases here recorded, as well as the histological examination, show how long an intraocular foreign body may be tolerated without local irritative phenomena.

In the year 1926, Bulson published an interesting work on the tolerance of the eye to foreign bodies which had penetrated to the posterior segment.

the operation undertaken for removal of the foreign body might in many cases do more harm than the foreign body itself. His deduction was that precipitous treatment was not desirable, and that there should be no haste either as to removal of the foreign body or of course with enucleation. According to this author the danger of sympathetic ophthalmia is just as great after removal of a foreign body as before, and he feels that the "ultraradicalism" of some ophthalmologists is not to be regarded as protecting the interest of the patient. In discussing this paper Lloyd Mills expressed himself against the

view of German authors that the persistence of a foreign body in the eye would cause sympathetic ophthalmia; a view which in Mills's opinion was based upon false statistics.

These views were only put forward by Bulson and Lloyd Mills a few years ago, whereas in the textbooks and in the lecture room for many years it had been advanced as a fundamental truth that a foreign body, especially iron, which had penetrated to the interior of the eye was to be removed as soon as possible; and that only if the patient had not come at once to the surgeon, and the foreign body had in the meantime become firmly established and encapsulated at a definite point in the eyeball, the fragment might be left in the eye and kept under observation subject to development of irritative symptoms or displacement of the foreign body from its position.

My prolonged observation and my recital of the first two cases are intended merely to call attention to the fact that encapsulated intraocular foreign bodies may remain for years with-

out causing irritative symptoms or sympathetic ophthalmia. My third case may be regarded as demonstrating that a splinter of iron may remain in a shrunken eyeball for as long a period as eighteen years without necessarily giving rise to irritative symptoms and sympathetic ophthalmia.

I am not altogether of the same opinion as Bulson, but must admit that we ought not to proceed too hastily to removal of iron splinters, and that prompt intervention is only called for when the splinter can be removed without considerable destruction of ocular tissue. This depends in the first place upon the location of the foreign body. It is also always necessary to have proper regard to the patient's vision and visual field. My first two cases show that the tolerance of the eye is rather considerable, and in my third case also the eye showed a quite remarkable tolerance for the presence of a splinter of iron, at least as regards sympathetic ophthalmia.

V. Nador-Utca 11.

LEGAL PHASES OF INDUSTRIAL OPHTHALMOLOGY

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CHICAGO

Many of the problems to be considered in handling industrial eye injuries are discussed. The need for accuracy and completeness of records is emphasized. Differentiation between results of the injury and preëxisting conditions is an important point. Before the industrial commission testimony should be simple, direct and based on proper records. Read before the Chicago Ophthalmological Society, May 18, 1931.

After many years of experience in industrial ophthalmology it has been shown that there are certain ramifications which are common to all phases of industrial medicine or surgery. Any doctor treating industrial cases should be able to assert his opinions definitely and intelligently on the witness stand. He should not depend upon his memory. The taking of a careful history when the case is first seen is of utmost importance, as well as an exact record of the physical findings at the time of first examination. Upon the physician's written findings, as well as his testimony, may depend the administration of justice to either employee or employer.

In industrial ophthalmology the condition of an eye prior to accident must be given careful consideration, as it is most important, because settlement of the case may depend on it.

It is possible to tell, almost from the time of first examination of the patient, whether or not the case will be contested. One soon learns the patient's attitude toward his employer and toward the insurance company, and needless to say, some cases require much more tactful handling than others. This is forcefully emphasized by the fact that everyone connected with industrial medicine, the commissioners, the insurance companies, and the physicians, are beset with ambulance chasers, whose runners even lie in wait outside the office doors of the physicians to waylay anyone coming out with a patch over his eye.

It has been found a good plan after the history has been taken to start examining vision with the malingering test. The patient is then given a chance to tell the truth. A superficial examina-

tion before taking the vision often gives one an idea of what to expect. Vision both with and without glasses should be registered carefully in this state, because the law in Illinois gives an injured man compensation based on vision without glasses. Unless correct vision is recorded at the time of examination, it is hard to prove later what it was. This applies to cases with refractive errors as well as to those with disease conditions or deformities.

Infections must be given careful consideration. In trachoma especially there is the aggravation of a preëxisting condition. Should a trachoma patient get a little sand or dust in the eye, or some trivial injury an infection may be started which may take much time to clear up. Ulcers may occur in old scars and claims may be made on these as if there had been no preëxisting lesions. When such scars are found on the cornea, their location should be noted especially as to whether they infringe upon the pupillary area or not. Old scars are always a potential point of argument.

Interstitial keratitis and pannus give little trouble, legally. Congenital conditions of the iris are frequently seen, such as colobomata which might be due either to iridectomy or to trauma. The pupillary reaction will usually determine this. Adhesions of the iris to the posterior surface of the cornea or the anterior surface of the lens are also significant. There is often considerable difficulty in determining the causes of lens opacity in patients over fifty years of age. There may be presenile cataract, peripheral striae or opacities of the lens; both eyes must be carefully examined to ascertain the preëxisting condition if possible. If there has been

a history of severe trauma such as a blow from a blunt instrument, a determination must be made as to whether or not there is a partial dislocation of the lens.

Cataract offers a peculiar problem, from the point of view of compensability. The State of Illinois has made a ruling that any eye operated on for cataract is an industrially blind eye, that is, that glasses are the same as crutches. Therefore any vision obtained by means of a glass is of no value to the insurance company. This ruling has worked a hardship on everyone concerned. Many men continue their work year after year although having cataracts in one eye. Suppose the other eye is injured. There has been a certain amount of amblyopia in the cataractous eye. The insurance company must pay for that eye even if the employee would have 20/20 vision if the cataractous eye were operated on. This is manifestly unfair, but this decision has been handed down by the supreme court some years ago, and has not been changed.

Floater in the vitreous frequently have given the first hint of intra-ocular foreign body and have been a starting point in the search for it. So far as ordinary floaters are concerned, those due to any degeneration or to a wound should be carefully differentiated. Discrimination between disease and injury in the retina and in the choroid is of great importance. There have been many cases in dispute over the question of retinitis proliferans, detachment of the retina, and other like conditions.

Optic nerve atrophy is seldom caused by injury. Involvement of the optic nerve in skull fracture or ocular trauma is rare so diseased conditions should be carefully sought.

Traumatic pathology involving only the orbit is seldom seen, though there are cases of depressed orbit, in which the cavity may be lowered as much as one-half or one inch with corresponding hypophoria on that side. Any involvement of the ocular muscles alone as a result of injury is rare.

The aggravation of a preëxisting condition—of which the so-called ambulance chasers make so much in their claims—is based mostly on the findings in trachoma. Trachoma has given rise to more argument at the Industrial Commission than any other condition.

With regard to sympathetic ophthalmia, there is no question that many eyes are removed which might be left and which, though blind, might never cause trouble. From the industrial standpoint, however, there are several phases to be considered. The average worker is a migratory person, here today and gone tomorrow. He does not know what is good for him; in cases of injury all he wants is his eye and his award. As a matter of fact he is a menace to himself. Sooner or later he may have a sympathetic ophthalmia. He has of course no recourse once settlement is made. Therefore, where an eye is blind the safest thing for both the man and the community is removal of the eye.

The compensation laws of Illinois are in conflict with those of neighboring states. Wisconsin probably has the ideal laws so far as adjustment for eye injuries is concerned. For example, in a case where there is injury to the eye involving a portion of the pupillary area, in this state the injured person gets so much for loss of vision, depending upon the truthful findings of the condition so far as central vision is concerned. In Wisconsin, besides central visual acuity the fields of vision are also considered. Therefore the man gets a fairer deal. In Indiana a workman is allowed 300 weeks compensation for the loss of an eye, but this starts as soon as he quits work. Here, he gets 120 weeks, but the temporary disability might be 500 weeks. In Indiana if a man has a cataract and it is operated on successfully he is considered to have good industrial vision. Admittedly for a time he will have some trouble with binocular vision, with his glasses, yet the insurance company considers that part of his sight has been conserved. The company benefits and the man also.

In appearing before the Industrial Commission, one is dealing with an arbitrator upon whose decision the matter rests. Most of the personnel are to be commended upon their knowledge of the law, of medicine, and of human nature. Most of them are eminently fair-minded and anxious to render justice to all concerned. The simplest testimony is the best, it should be given in the fewest words possible, and backed

by an accurate record of the case under advisement. There should be co-operation between doctors and insurance companies to the extent of endeavoring to keep employees out of the hands of ambulance chasers; to deal fairly with each other, and to see that the interests of both employer and employee are served.

25 East Washington street.

A PRACTICAL DEVICE FOR RADIOGRAPHIC EXAMINATION OF THE OPTIC FORAMEN

DR. RAUL ARGANARAZ

BUENOS AIRES

(TRANSLATED BY DR. W. H. CRISP)

Radiographic examination of the optic foramina is of diagnostic importance in many conditions such as tumor of the optic nerve, periostitis or bony lesions in the optic canal, cranial deformity, as in fractures of the base, or lack of development of the skull. To obtain proper radiographic representation of the optic foramen the head must be held at exactly the correct angle to the radiographic plate. With the chin downward the head is tilted laterally 38° , and upward 38° , bringing the axis of the optic canal perpendicular to the plate. The author's apparatus for use in placing the head in this position is described. Explanatory diagrams and photographs are shown. From the Department of Ophthalmology of Buenos Aires, of which Dr. Raul Arganaraz is professor.

In recent years radiographic examination of the optic foramen has assumed considerable diagnostic importance.

Van der Hoeve was one of the first to call attention to the importance of radiography of the optic foramen in tumors of the optic nerve and in lesions of the sphenoidal and ethmoidal sinuses with or without ocular symptoms.

In the diagnosis of meningiomas of the stem of the optic nerve, of its intracanalicular portion, and also of the optic chiasm from which the nerve takes origin, radiography of the optic foramen is of inestimable value.

In cases of unilateral or bilateral blindness consecutive to periostitis or to bony lesions developing in the bony canal of the optic foramen, only radiography of the optic foramen is capable of affording a diagnosis (atrophy of the optic disc, papilledema, hypophyseal tumor, and so on).

In cases of cranial deformity the radiographic changes have been well studied by Harry A. Goalwin.

In fractures of the base of the cranium with deformity or lack of development of the optic foramen and resulting visual disturbances, radiography of the optic foramen is unquestionably of capital importance for diagnosis and prognosis.

Radiography of the optic foramen may be of equally valuable service in cases of unilateral exophthalmos in which the diagnosis is difficult.

We are indebted to Goalwin of New York for the most complete study which has so far been made not merely with regard to radiography, but also concerning topographic anatomy of the optic canal in man. It is upon the basis of Goalwin's work that the present writer has found it possible to devise the apparatus which is the subject of this article, and by means of which it is apparently possible to obtain an appreciable simplification of the technique for exact radiography of the optic foramen.

Goalwin states that it is impossible to make an exact radiograph of the op-

tic foramen without knowing the direction of the axis of the canal. According to his investigations in adults, the sagittal axis of the cranium in the median anteroposterior line forms with the axis of the optic canal an angle of thirty-eight degrees (Fig. 1). The hori-

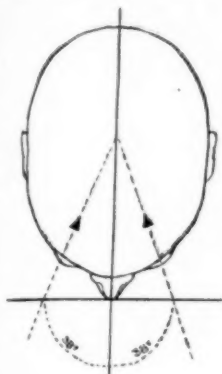


Fig. 1.

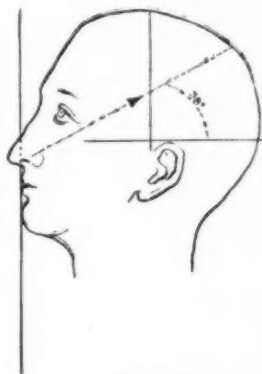


Fig. 2.

zontal line of the base of the cranium also forms, with the direction of the axis of the optic canal, an angle approximately equal to thirty-eight degrees (Fig. 2). That is to say, the direction of the axis of the optic canal is outward and downward in relation to the vertical and horizontal planes, respectively.

(1) If we place the patient in abdominal decubitus, that is to say with his mouth down, the angle of the canal will be at thirty-eight degrees approximately. In order that the plane of the

canal may be perpendicular to the plane of the x-ray plate the patient will need to turn his head laterally at an angle of thirty-eight degrees approximately. By this arrangement the plane of the axis of the canal is vertical to that of the x-ray plate. This is the first position to be studied in accordance with the principles laid down by Goalwin (Fig. 3).

(2) If we observe the patient laterally as indicated in figure four, we see that the plane of the axis of the canal still forms an angle of approximately thirty-eight degrees. For it to fall vertically the patient will need to raise his head, keeping the chin in its original position, so that the plane of the axis of the canal may be perpendicular to the plane of the x-ray plate.

These, therefore, are the two positions which must be assumed by the patient's head in order that the axis of the optic canal may be perpendicular to the radiographic plane.

Goalwin, in the article already quoted, advises the use of a cap or helmet of white fabric on which are traced lines to indicate the angles already described (Fig. 5). This cap is washed after use, and is employed to measure the angles for each patient.

We have had constructed* the appliance here illustrated, which we may call the universal model, and with which

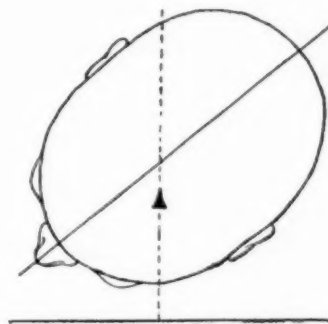
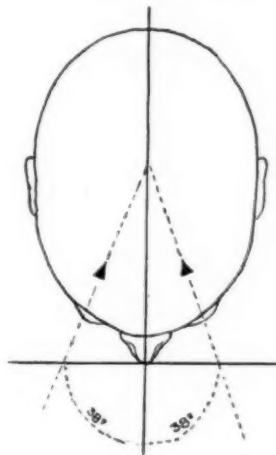


Fig. 3.

* By Lutz Ferrando and Company of Buenos Aires.

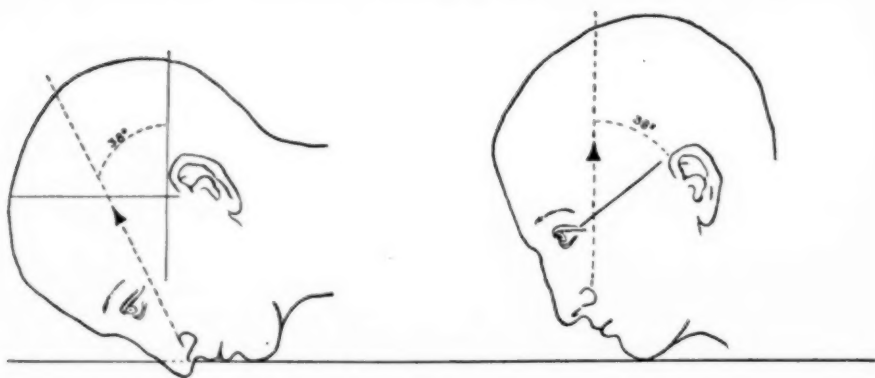


Fig. 4.

my distinguished colleague and chief of clinic Dr. Sená has recently taken a series of excellent radiograms of the optic foramen.

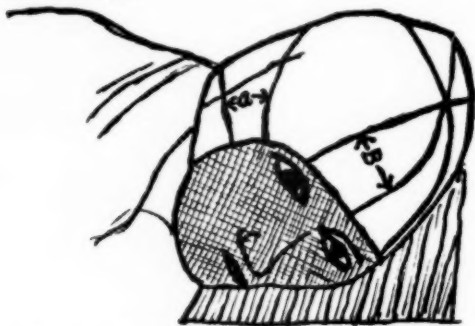


Fig. 5 (Argañaraz). Cap or helmet of white fabric, closely adjusted to the cranium, used by Goalwin for radiography of the optic canal. (Sketched from photograph in Goalwin's article.)

Our apparatus, as may be seen in figure 6, is formed by two pieces of celluloid similar to those employed by rhinologists to support the head mirror. At the intersection of these two pieces there is a graduated semicircle, in the center of which is a small knob three centimeters in diameter; and fastened to the apex of this knob is a thread which carries at its other end a small weight. The patient being in the recumbent position, we can incline his head until the thread, which acts as a plumb line, shows approximately an angle of thirty-eight degrees (Figs. 7 and 8).

At the sides of the apparatus, and capable of sliding along the strips of celluloid, there is another semicircle with its thread and weight, by means of which we can determine the angle

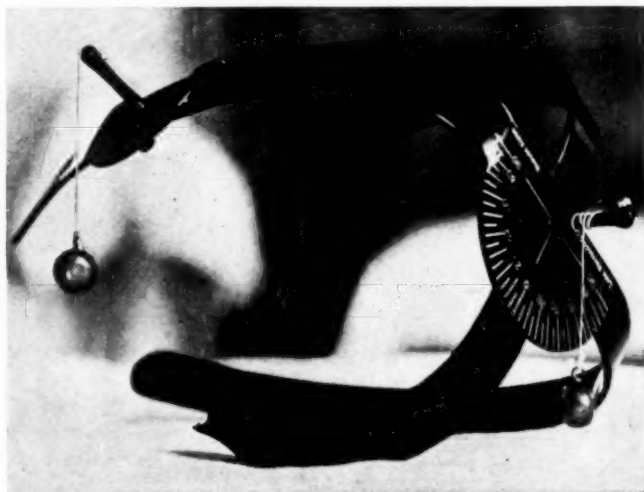


Fig. 6 (Argañaraz). Author's device for regulating position of the head in radiography of the optic canal.

at which it is necessary to raise the forehead of the patient in order to make the axis of the optic canal coincide with the vertical (Figs. 8 and 9).

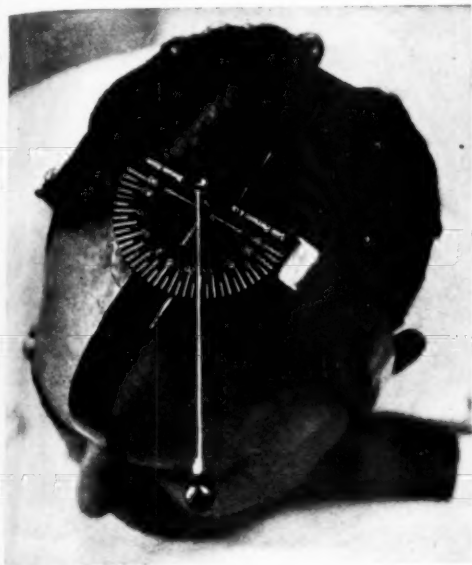


Fig. 7 (Argañaraz). Plumb line on author's device indicates 38 degree lateral tilt of the head to bring axis of the optic canal into a plane perpendicular to the radiographic plate.

When the radiograms of the optic foramen have been obtained, it is necessary to decide whether we are dealing with a normal or a pathologic for-

made in my service, using invariably the same technique, we found that the diameters of the opening in question were not equal in different patients.

Goalwin, whose statements on these scientific questions are authoritative, has given us information as to the nor-



Fig. 8 (Argañaraz). Plumb line shows head raised 38 degrees to compensate for the angle the axis of the optic canal makes with the plane of the base of the skull.

mal diameter of the optic foramen. It varies according to the individual, the age, the shape of the cranium, the race, and so on. It may be regarded as aver-

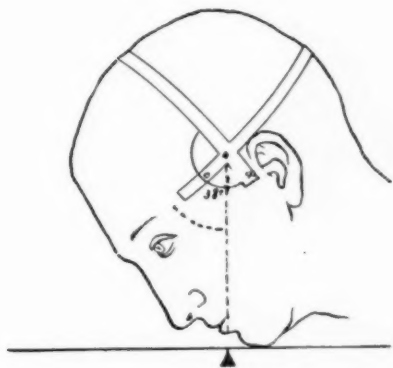
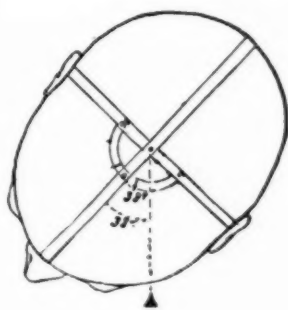


Fig. 9 (Argañaraz). Diagrams representing the proper position of the head.

men. That is to say, it is necessary to know in each patient the normal diameters of the foramen.

Upon examining the series of radiograms of the optic canal which were

aging 4.5 mm. The measurement thus made on the skeleton does not correspond exactly, as will readily be understood, with that obtained in the x-ray negative, for in the latter the di-

iameter of the opening will depend upon the distances between the plate, the optic foramen, and the Coolidge tube.

With this relationship in mind, Goalwin proposes the following formula for obtaining the diameter of the cross section of the optic canal:

$$X = d - \frac{b}{a} (f + d)$$

in which X is the diameter of the canal, d is the corresponding diameter on the plate, a is the distance of the plate from the Coolidge tube, b is the distance

from the posterior end of the optic canal to the plate, and f is the diameter of the focal surface of the x-ray tube.

In order to know whether the optic foramen which we have radiographed is normal or pathologic in size, it is of practical advantage to take immediately, at the same sitting, a radiogram of the optic canal of the other orbit, following the same technique. The comparison between the two canals may furnish important information as to the existence of pathological variations.

728 Paraguay street.

References

- Goalwin, H. A. Der canalis opticus bei normalen und deformierten Schalen. *Zeit. f. Augenh.*, 1924, v. 54.
 ———. Die exakte radiographische Darstellung des canalis opticus. *Fortschritte aus dem Gebiete der Röntgenstrahlen*, 1924, v. 32.
 ———. The precise roentgenography and measurement of the optic canal. *Amer. Jour. Roentgenology*, 1925, v. 13.
 Van der Hoeve. Optic nerve and accessory sinuses; roentgenography of the optic foramen in tumors and diseases of the optic nerve, 1922-1925.

NOTES, CASES, INSTRUMENTS

OPTICOCILIARY VESSEL

AMBROSE EARL EDGERTON, M.D.
SAN FRANCISCO

A rare vascular anomaly is an opticociliary vessel, which arises from a central retinal vessel, passes under the edge of the disc and disappears into the choroid. These vessels do not pass into the retina.

A woman forty-six years of age, came to the office complaining of poor near vision. She had worn glasses for



(Edgerton). Opticociliary vessel.

a long time, having been last examined three years ago. Vision in each eye without glasses was 6/9 and with her own correction, her vision was 6/6-4. She was wearing in each eye +1.D.sph. = +.25D.cyl.ax.90°.

The lids and conjunctivae and tear sacs were normal. Pupils were 3 mm. in diameter, round, equal, and reacted normally to light and accommodation. Consensual reaction present on each side. The anterior chambers were of normal depth, finger tension was normal, and the rotations were free and equal in all directions.

Ophthalmoscopic examination of the right eye, showed the media to be clear, disc oval, with edges fairly well defined

and the vessels and fundus normal. The left eye was similar, except that from the temporal quadrant of the disc a large vein emerged into a horseshoe bend, then returned to the disc and disappeared into the choroid.

In this case, the anomaly was unilateral, as are the few cases which have been reported. The vessel was the same tint as the other veins, but was much broader.

The perimetric and scotometric fields, taken on a Ferree Rand perimeter, showed a slight enlargement of the blind spot, using a 1.7 mm. white test object. Colors also showed a slight contraction when tested with 2 mm. test object. The form fields were normal.

This case is reported on account of its rarity.

450 Sutter street.

PARTIAL OCCLUSION OF RETINAL VESSELS IN A CASE OF THROMBOANGIITIS OBLITERANS*

EDWARD BELLAMY GRESSER, M.D.,
F.A.C.S.
NEW YORK

Simultaneous complete or partial occlusion of the central retinal artery and vein has been rarely seen. The following description of bilateral partial occlusion of the central retinal vessels occurred in a case of thromboangiitis obliterans.

The descriptive title coined by Leo Buerger refers to an obliterating disease of both veins and arteries of the extremities brought about by thrombus formation. It is an independent affection and bears no relationship to arteriosclerosis.

The cause of the malady is obscure. Buerger points out that it occurs almost entirely in male Russian, Polish, or

* From the Department of Ophthalmology and Third Medical Division (New York University), Bellevue Hospital, New York City.

Roumanian Jews of thirty to fifty years of age, of the poorer classes. Excessive cigarette smoking and the eating of rye flours are evident in the histories. High total red cells and platelets and glyco-philia are suggested as possible causative agents (Willy Meyer).

The early changes consist of an acute inflammatory process of all the vascular coats of the deeper arteries and veins. This is followed by thrombosis: the formation eventually becoming organized and canalized. An accompanying periarteritis binds together the veins, arteries, and nerves. Usually the deeper



(Gresser). Thromboangiitis obliterans.

vessels of the peripheral regions of the legs are involved, though not infrequently the upper extremities are affected.

Case report: M. F., male, aged fifty-six years, Russian Jew. Sudden loss of vision O.D. four weeks previous to admission. Failing vision in both eyes during past five months. Left hemiplegia one year ago; cleared in five weeks. Left leg amputated (thigh) ten years previously, right leg nine years ago due to gangrene (thromboangiitis obliterans).

Nose, lips, and nail beds cyanotic. Chest clear, heart negative. Brachial and radial arteries sclerosed. Femoral arteries not palpable. Loss of vibratory powers in upper extremities.

Red cell count 4,300,000; hemoglobin 55 percent. Platelets 210,000; Nonprotein nitrogen 34; Creatinine 1.4 mg.; Sugar 80 mg.; Wassermann negative. Urine: Specific gravity range 1.005-1.020. Pheno-sulpho-phthalein test 20/26. Blood pressure average 106/64. X-ray: Calcification of pineal body. Large calcified area in brain at a point 2.5 cm. above and posterior to pineal body.

At the time of examination the intra-ocular tension (Schiötz) was normal in each eye. Three days later typical acute glaucoma involved the right eye, glaucoma became absolute despite therapeutic efforts.

Externally the eyes were negative. The fundi were alike in appearance and detail. The discs were edematous, the cupping indefinite, and fine vessels evident. The macular areas were also edematous, blurred, and with a faint cherry red fovea. Fairly large, round, and irregular hemorrhages were present throughout the fundi, though more evident in the posterior polar areas. White, fluffy areas of degeneration were distributed throughout.

The vessels showed the most evident changes. The arteries, although exceedingly fine and attenuated, manifested definite light streaks, coppery in color. They branched at acute angles and indented and deflected the veins at the crossings. No completely fibrosed arteries were observed. An occasional tortuous, corkscrew twig was present.

The veins, twice (at least) the caliber of the arteries, were narrower than normal. The normal venous loops were lost, though some finer branches were well convoluted and their hue was dark plum colored. The venous blood column was segmented and granular. The flow, at times, was fairly rapid. Then again it apparently stopped with widening of the segments and reversed its flow for a few seconds, then it flowed again toward the disc with quickening of its rate and shortening of its segmentation.

This picture lasted three days in the right eye until blotted out by the glaucoma. The left eye gradually lost the venous segmentation within a few days,

but this was seen again at intervals until the patient disappeared.

The occurrence in a middle aged male Russian Jew of partial occlusion of both central retinal arteries and veins in conjunction with a proven past classical

picture of Buerger's disease leads to the opinion that this is a rare picture of thromboangiitis obliterans of the retinal vessels.

39 Fifth avenue.

References

- Buerger, L. The pathological and clinical aspects of thromboangiitis obliterans. *Amer. Jour. Med. Sci.*, 1917, v. 154, p. 319.
 Frauenthal, H. W. Obliterating endarteritis. *Internat. Clin.*, 1918, v. 4, p. 62.
 Kunne, B. Über Mesoperiarteritis. *Frankf. Zeit. f. Path.*, 1910, v. 5, p. 107.
 Meyer, Willy. Etiology of thromboangiitis obliterans. *Jour. Amer. Med. Assoc.*, 1918, v. 71, p. 1268.
 Weber, F. Parkes. Thromboangiitis obliterans. *Quart. Jour. Med.*, 1915, v. 9, p. 289.

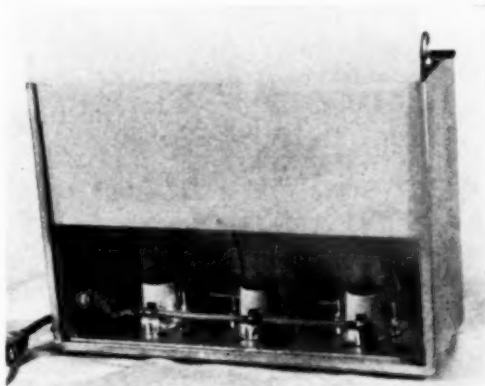
TANGENT SCREEN LIGHT

RAYMOND J. SISSON, M.D., F.A.C.S.
DETROIT

The box, 45 x 25.5 cm., shown in the photograph is constructed of light weight metal covered by aluminum paint. There are three bulbs inside, two of 100 Watt and one of 150 Watt power. A flashed opal glass is placed in the front of the box to aid diffusion. Air holes are located above and below to allow circulation and prevent overheating. The aluminum paint on the inside of the box acts as a reflector. A switch is conveniently located near the box. The illumination provided in a darkened room at the distance of 2.5 meters is 8 foot-candles at the fixation point and 7 foot-candles at the edge of a two meter tangent screen.

This light was constructed for the purpose of supplying a constant measured illumination for delicate field work at the 2 meter distance and to make possible the use of the tangent screen at all hours of the day or evening. The box may be placed on the wall or suspended from the ceiling. It should be above the patient's head to avoid a shadow being thrown on the screen and to insure even distribution of light. If the distance from the screen is not 2.5 meters it will be necessary to change the size of the lamps. This is easily done and the range in intensity can be varied to suit any special needs.

The measurements and models were made through the courtesy of D. E. Trefry of the Detroit Edison Company.



(Sisson) Lighting unit for two meter tangent screen.

This box is made very inexpensively by the Willey Sign Company, Detroit.
825 David Whitney building.

CONGENITAL ABSENCE OF MEMBRANOUS LACRIMAL DUCT

THOMAS H. ODENEAL, M.D., F.A.C.S.
BEVERLY, MASSACHUSETTS

This anomaly, according to the textbooks, is incurable, and it was with considerable trepidation that I operated on my first case. This having proved a suc-

cess I felt no hesitancy in attacking the next case I encountered.

One of these patients was operated on fifteen years ago and the other eleven. Both of them were children at the time, young men now, and I have had occasion to see them both in the past year,

and found the ducts were functioning normally. A Stevens knife was employed to make the duct which was dilated with the largest size probe, following this a Fox gold canula was worn for four months in one case and six in the other.

SOCIETY PROCEEDINGS

Edited by DR. H. ROMMEL HILDRETH

COLLEGE OF PHYSICIANS OF PHILADELPHIA

Section of Ophthalmology

April 16, 1931

DR. H. MAXWELL LANGDON, chairman

Spontaneous complete absorption of a cataractous lens.

DRS. T. B. HOLLOWAY and ALFRED COWAN presented J. P. aged forty-six years, a mechanic who came to the dispensary of the University Hospital on October 24, 1928, complaining of dimness of vision in the left eye for the past two weeks. He had been unaware of poor vision previous to this time, although he admitted that he had had no eye examination. There was no knowledge of traumatism. Outside of a gastric ulcer, for which he was operated on in 1922, he had always been in good health. He had been married 20 years and had had no children. He was the oldest of 18 children, of whom 13 died in infancy or early childhood; otherwise his family history was of no importance.

The pupils were equal and reacted promptly to the various reflexes. In the right eye the vision was 6/6. The media were clear. The disc was healthy, oval, and with the upper border slightly blurred. The vessels were somewhat tortuous and the veins showed some "kinking" where the arteries crossed, indicating early sclerosis. There were no fundus lesions.

In the left eye vision was reduced to light perception. The cornea and aqueous were clear. The undilated pupil was blocked by a cataractous lens. With dilated pupil the whole lens appeared shrunken, especially in the anteroposterior diameter, making it wafer-like. When the patient fixed straight ahead, the lens was slightly luxated down and out, leaving a very small, crescentic, dark area in the upper nasal portion of the pupillary space. Physical examina-

tion and all laboratory tests revealed nothing abnormal. The patient again denied any knowledge of injury to the eye.

He was seen at intervals of about two weeks. The lens slowly but steadily decreased in bulk until, in April, 1929, it was reduced to a thin wafer which sank almost to the lower pupillary border. A good view of the fundus could be obtained. Absorption was now progressing more rapidly and in May, 1929, the small, white disc that represented the remains of the lens was visible only when it bobbed up with marked rotation of the eye. A flat, perfectly transparent, thin membrane across the whole pupillary space, just behind and free from the iris, could be seen with the slit-lamp and corneal microscope. This membrane was not lens capsule, although the surface had a very fine, shagreen appearance and gave a bright iridescence in specular reflection. Numerous, tiny white spots were scattered over the surface of this membrane and behind it, in the vitreous, were two narrow, transparent, scroll-like structures. One of these extended from "8 to 10 o'clock" and the other from "1 to 4 o'clock" in the pupil, 8 mm. in diameter.

In December, 1929, no trace whatever of any part of the crystalline lens could be seen.

On April 7, 1931, the delicate scrolls in the vitreous could still be seen. The thin, transparent membrane, stretching across the pupillary space, lay just behind the plane of the iris. Behind the membrane there was an optically clear space and behind this space, in the vitreous, were the tubular structures. With the ophthalmoscope these structures appeared transparent. A few fine opacities could be seen in the vitreous. The disc was slightly oval and healthy. There was some pigment in the periphery of the fundus, and in the extreme temporal periphery a circumscribed retinochoroidal lesion, measuring about 4 mm. in diameter, with pigment proc-

esses, one which was longer than the others, extended toward the disc along a retinal vessel. The form field showed some nasal contraction. The vision was 6/6 with +14.00 D.sph.=+.25 D.cyl. ax. 45°.

The intraocular tension had always been normal, but on April 9, 1931, it was found to be 36 in the right eye and 33 in the left eye (Schiotz). The patient was given a one-half percent solution of pilocarpin and on April 13, 1931, the tension was 33 in the right eye and 30 in the left eye. At no time were there any other symptoms of glaucoma.

Discussion. DR. HOLLOWAY said that they had watched this case with a great deal of interest at the University Hospital, for the past few years, and that all of the details were as Dr. Cowan had described. The interesting thing, of course, about this case was the spontaneous absorption. He said that they all knew that in many of these cases of spontaneous absorption, one of the interesting phases was the frequency with which it was associated with glaucomatous symptoms. While a certain number might have these symptoms, no active signs were present in this patient.

DR. POSEY said that in 1918 he was consulted for glasses by a boy who was at that time fourteen years of age. Nothing abnormal was detected in the right eye other than the fact that vision could not be brought up to more than 5/12 with correcting lens.

There was no history of traumatism and when seen the eye was quiet and the lens clear, the pupil the same size as its fellow and the pupillary border normal; the iris reacted well to light. He was seen again in 1921 and no change in the eye was noted.

The boy was seen again in 1923 when there were some opacities noted in the lens and at that time the boy was turned over to Dr. Posey's assistant, Dr. Swindells.

In 1929 Dr. Posey was again asked by the father of the patient to see the boy as he felt that something should be done as it was found that a cataract had developed in the right eye. There had been no inflammatory symptoms

and no rise of tension. In February, 1930, the eye showed a fully developed cataract, the anterior chamber was normal in size and the iris reacted to light.

The question naturally was as to the cause of the cataract; it was thought possible that there might have been a foreign body going through the lens, but x-ray showed none. It was then thought possible that there might be a growth of the ciliary body which pressed upon the lens and interfered with its nutrition.

Dr. Posey counseled against operation in view of the uncertainty of the origin of the cataract and of what might be back of it. Shortly after this the boy began to notice that he could see out of the eye and he again saw Dr. Swindells who called Dr. John T. Carpenter in consultation. It was found that the lens was partly subluxated and that there was some vision eccentrically, equal to counting of fingers when held down and out. The eye was quiet. Dr. Posey saw the boy again about a month ago because of diplopia, the visual axes not being parallel. The anterior chamber was now found to be deep, the lens shrunken and the pupil practically clear. With a plus 9 D.sph. the vision came up to 5/15. There had been practically total absorption of the cataract, probably explained by a previous rupture of the posterior capsule of the lens by some blunt force in early life which had left no discernable injury. No evidence of damage to the anterior capsule had been visible at any time.

DR. ZENTMAYER said that in November, 1890, he had seen in his office a man aged sixty-two years, a typesetter, who came on account of an inflammation in the right eye, and gave a history that the sight of his left eye began to fail in 1876. This progressed until at the end of three years he was unable to see more than light. In 1887 he had been told at the Pennsylvania Hospital, that he had a cataract and should have it removed.

When first seen by Dr. Zentmayer the uncorrected vision was 3/150, the sight having gradually improved, and

with a plus 11 D.sph. it was 5/5. In the right eye there was an active iritis and the lens was cataractous. In the left eye the media were clear, the disc appeared small and there was a broad atrophic conus to the temporal side. The fundus was plainly seen with plus 11 D.sph. The eye was aphakic. When last seen, five years later, the vision in this eye was 5/6.

Dr. Zentmayer said that of course his case was not as authentic as that of Dr. Holloway and Dr. Cowan as he did not observe the absorption of the lens, but only saw the end result. He felt quite certain however, that traumatism was not a factor.

On another occasion he had observed the absorption of a cataractous lens. He had seen the child in infancy with the persistence of a hyaloid vessel. The lens at that time was clear. When the child was five years of age the lens became cataractous. When seen after the lapse of several years the lens matter had become entirely absorbed and the hyaloid artery could again be seen extending from the posterior capsule to the disc.

Regarding the development of increased tension in the eye, in his experience this occurred so frequently in aphakic eyes as a late sequel to cataract extraction that he had felt the need of some means of preventing it. This he thought might be accomplished by doing a preliminary iridectomy, making it basal as for glaucoma, hoping that this might prove a prophylactic measure. He had done this for only about ten years; of course, too brief a time to judge whether it had been of value.

Senile macular changes of the retina, associated with focal infection

DR. HUNTER SCARLETT, (by invitation) read a paper on this subject which was published in the September number of the American Journal of Ophthalmology, p. 932.

The syphilitic optic atrophies

DR. JOSEPH EARLE MOORE of Baltimore, Md. (by invitation), discussed

the rôle of syphilis in the etiology of the optic neuropathies, and emphasized the necessity for careful and complete study of each patient as a diagnostic problem. The most important of the syphilitic optic atrophies was the so-called primary atrophy. Its relationship to tabes and to other forms of neurosyphilis was mentioned and it was estimated that at any one time there were about 50,000 patients in the United States with this condition. Great stress was laid on the necessity for early diagnosis by means of coöperation between ophthalmologist and syphilologist, the routine ophthalmologic examination of all neurosyphilitic patients and use of such diagnostic aids as carefully taken visual fields and tests of dark adaptation.

The pathology of the lesion was discussed and it was pointed out that the process began in the marginal fibers of the intracranial portion of the optic nerves, anterior to the chiasm; but that there was as yet no agreement as to the relationship of degenerative to inflammatory processes, or as to the presence or absence of treponemes in the optic nerves.

The treatment of syphilitic primary optic atrophy prior to the introduction of the arsphenamines was hopeless, and even these drugs, routinely employed, did not materially improve the prognosis. Two modern treatment methods, namely, subdural therapy and fever therapy, had been found in various parts of the world, to be of some value in arresting the progress of the disease, and in preserving useful vision. Lantern slides were shown, illustrating the application of these methods of treatment in individual patients, followed over periods of 3 to 14 years. It was concluded that in a patient with early primary optic atrophy (vision in the better eye 20/40 or more), subdural treatment by various routes (intraspinal or intracisternal) and with various substances (arsphenaminized serum, neoarsphenamine, mercury or air), combined with appropriate general antisyphilitic treatment, offered at least a 50 percent chance of arrest or even slight improvement, and that by this

means useful vision might be preserved for periods of time long exceeding the average expectancy of two years from the onset of symptoms. Fever therapy (malaria), while also successful in a somewhat smaller proportion of cases, was more likely suddenly to extinguish the patient's remaining vision, it was more dangerous to life, and patients treated with it had not yet been followed for a long enough period of time to be sure of the permanency of results. The choice of a treatment depended on the general physical and neurologic status of the patient, as well as on the condition of his eyes.

Discussion. DR. STOKES, speaking as a syphilologist, said that he felt that Dr. Moore had made, on the basis of the evidence submitted, a genuine and hopeful contribution to the still very limited control of primary optic atrophy in neurosyphilis. The situation was of interest particularly because throughout the larger part of the field of neurosyphilology, intraspinal therapy was steadily losing ground and was being replaced by trypanarsamide and the various devices for inducing high body temperatures. In fact, though when he first came to Philadelphia, he equipped his department at the University Hospital for the administration of intraspinal therapy, he doubted if it had been necessary to treat a dozen patients by this method in the past six years. This, of course, was largely because this form of treatment was not applied to primary optic atrophy. Dr. Stokes said they would await with keen interest Dr. Moore's further and confirmatory report on the very much larger material of this type, which he was handling at the present time. He said that in the meanwhile he very much feared that the individual isolated observer would continue to have the same disconcerting experiences with individual cases that have discouraged them all in the past. Dr. Stokes said that only in larger aggregates and by persistent patient determination, could one bring forward such impressive evidence for a relative degree of hopefulness in prognosis in a condition both logically and practically

unamenable to treatment. It would seem that services such as that of the Wills Eye Hospital, in which accomplished syphilologists like Dr. Klauder had at their command what must be a very large material, were the proper places, in Philadelphia particularly, for putting this new hope to the test of experience.

A. G. FEWELL,
Secretary.

ROYAL SOCIETY OF MEDICINE, LONDON

Section of Ophthalmology

October 9, 1931

MR. ELMORE BREWERTON, president

Pseudoglioma

MR. A. CADDY showed a boy whom he had examined last May. The boy was not complaining, but his mother noticed a white reflex from the left eye. He had had measles two years before. A large mass was to be seen in one eye, growing from the retina and extending into the vitreous. A week ago this mass had remained much as before, and another mass was present on the naso-inferior quadrant of the retina, showing that the inflammatory condition which the exhibitor considered it to be, was now getting worse. He regarded it as pseudoglioma, probably due to an obscure infection which might have dated from the attack of measles two years before.

Macrophthalmos

MR. F. W. LAW presented a man aged twenty-three years, who came with the complaint that his right eye had always had poor vision. The globe was tremendous, and there was myopia to the extent of 24 D., with 5 D. of astigmatism. He could count fingers at two feet. There were many vertical ruptures of Descemet's membrane.

Coates' disease

MR. M. F. LAW showed a case of this disease. Vision in the right eye was 6/5, that of the left, ability to count fingers. The tension was normal. In the left eye

was a mass of exudate at the macula, presumably a pigment deposit. This mass seemed to be connected with the optic disc by very fine strands, but Mr. Neame regarded it as a purely optical defect. Smaller deposits could be seen around this mass, and many scintillating peripheral deposits two-thirds of the way out and upwards. It compared well with the third case described in Coates' original paper.

Episcleritis

MR. MACCALLAN exhibited a male patient who had had the disease thirteen years, during which time he had submitted to a variety of treatments. He came under the speaker's observation last December, when he was found to have a number of septic teeth. These were removed, and antrotomy and turbinectomy were performed. Since those operations there had been steady improvement, and now he had no pain nor discomfort, and vision was 6/6 in each eye. There had been no ocular treatment, beyond a few drops of normal saline solution.

(Reported by H. Dickinson)

CLEVELAND OPHTHALMOLOGICAL CLUB

November 9, 1931

DR. RAY B. METZ, chairman

Monocular esotropia

DR. LUTHER C. PETER said that in order to appreciate fully the steps necessary to effect a cure in monocular esotropia he must go back to the first principles which were operative in the production of squint, to discuss briefly the symptoms of squint other than the manifest loss of parallelism of the visual axes.

The second condition to be recognized was the amblyopia which was either ignored or regarded as congenital. It was known that amblyopia was a condition acquired in a short time after monocular squint became established. Proof that the amblyopia was not congenital was the fact that it could

be transferred to the other eye, and that a small central scotoma about 3 mm. in diameter could be outlined, and that the same would disappear under suitable treatment.

A third symptom was the defect in the fusion faculty. Cases of convergent squint were sharply divided into two groups, one, in which the fusion faculty was totally absent, a true alternating squint, and the second, in which a fusion faculty was present but poorly developed, resulting in a monocular type of squint.

In the etiology of monocular esotropia the one dominating cause was a defective or absent fusion faculty, fusion sense, or fusion power. At the end of the first year fusion was fairly well established in the normal child. It continued to develop during the first seven years of life.

The second important factor in the production of squint was the presence of ametropia in which hyperopia was the prevailing refractive error. A normal fusion faculty would hold the eyes in perfect alignment with single binocular vision, even in the presence of high and unequal refractive errors.

Heredity was the third factor to be considered. The child inherited his or her refractive errors and also the tendency to a weak or absent fusion faculty from the parents or indirectly from a more remote source.

There were three degrees of fusion recognized; first, cases having simultaneous macular perception, second, those having weak fusion with but little amplitude, and third, those cases having in addition to fusion a sense of depth perception.

The management of squint cases depended on a diagnosis based on the above symptomatology and etiology. The important symptoms referred to were the squint, amblyopia, and the defective fusion faculty. The secondary ones were the defective rotation, relaxed external rectus, much thinning of conjunctiva and capsule over the rectus muscle, or a contracted and tense internal rectus and capsule.

In the treatment of monocular squint, glasses should be fitted as early

as possible, even as early as sixteen months. There would be no trouble in getting the child of sixteen months to accept a correction of four diopters or over. By using atropin a fair estimate of the refractive error could be made with the ophthalmoscope in these very young children.

The fight against amblyopia ex anopsia was the second important step, and in some cases the first, as this fight could be kept up until the eyes were straightened, or at least until after the seventh year of age, when amblyopia was not apt to occur. The methods of preventing and of treating amblyopia ex anopsia were discussed at length. The advisability of transferring the squint as well as the amblyopia was pointed out, and above all, the ability to correct amblyopia by suitable training was stressed.

One should study the fusion in order to make the classification of the squint. Training of fusion in alternating squint was a waste of time. If the squint was of considerable degree one should operate at an early age. The training of fusion could be carried on after operation.

Dr. Peter discussed the different types of operation for squint and said that he preferred the Worth advancement with his own method of recession if a supplementary operation was needed.

Discussion. DR. A. B. BRUNER asked what Dr. Peter considered an anisometropia and stated that he thought the age at which to operate was a debatable question as was also the question of resection and advancement.

DR. PETER answered Dr. Bruner and questions from Dr. Monson, Dr. Simonds, and Dr. Thaw by stating that both eyes were bandaged for five days after advancement and for four days following recession. The chief use of the tucking operation was in the treatment of the phorias. Dr. Peter said that he would operate on a child three or four years old if no improvement was shown after the use of glasses for three months. If a muscle was not receded more than 5 mm. convergence would not be interfered with. An early result was desirable in order to avoid the bad psychological effect on a child from

having crossed eyes. The child should be operated on during the formative years and after early operation the after treatment would be shorter.

PAUL G. MOORE,
Secretary.

LOS ANGELES SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

November 9, 1931

DR. EUGENE LEWIS, president

Academy meeting

DR. A. RAY IRVINE gave a résumé of instructional courses attended by him at the meeting of the American Academy at French Lick in September. He went into detail concerning Schoenberg's explanation of the Gonin technique. It was stated that Benedict had discarded sutures in cataract surgery at the Mayo clinic. In Peter's course emphasis was laid on the fact that the central scotomata of amblyopia ex anopsia could be reduced by training.

Dr. William Boyce had attended King's course on chronic iritis and thought that he was over enthusiastic in finding a tuberculous basis for so many cases. The tests for the early diagnosis of glaucoma in Gradle's course were given in detail. The courses of Rutherford, Gifford, and Lloyd were also described.

Diffuse papilloma of the limbus

DR. M. F. WEYMANN presented a discussion of diffuse papilloma of the limbus with case reports, which will appear in full in this Journal.

Discussion. DR. A. RAY IRVINE wished to emphasize the value of the thermophore in the treatment of these tumors. In his case, which was mentioned by Weymann, the growth had been dissected off several times with recurrence, but after one thermophore application the patient had remained cured. He was seen several years later with no recurrence.

Syphilitic optic atrophy

DR. JOSEPH EARLE MOORE of Johns Hopkins University presented this sub-

ject by invitation. (See proceedings of section of ophthalmology, College of Physicians of Philadelphia, in this issue.)

Discussion. DR. M. N. BEIGLEMAN stated that the fundamental problem of the oculist was to preserve vision. Ophthalmoscopically a descending atrophy might appear to be a primary atrophy, although the former responded to treatment more readily. If one considered only the true cases of primary tabetic atrophy, the improvement in therapeutic results in the last few years had not been up to expectations. Spirochetes had never been found in the nerve proper, but in the septa and meninges. Whether syphilitic optic atrophy was an inflammatory or degenerative change was not yet clear. Cases of true primary atrophy should be observed over many years before conclusions were drawn. This was shown by two groups of cases reported by Dr. Moore, one by Fischer, and one by Elschnig. The two reports were of the same group of cases, the first being favorable, and the second unfavorable because the cases had been observed longer. In 150 cases of primary optic atrophy reported by Krol, no early antiluetic treatment

had been given. It was asked if early treatment in all cases of lues might not prevent the occurrence of optic atrophy.

DR. S. O. CHAMBERS deplored the fact that tryparsamide was represented as being so dangerous and stated that in his experience it did not injure eyes affected with optic atrophy.

DR. MOORE in closing stated that it was obvious that if all early syphilis were properly treated there would be no central nervous system lues and naturally no syphilitic optic atrophy. Most patients with optic atrophy have had little or no early treatment. He has had two patients who went blind after the use of tryparsamide, and Cady and Alvis have reported similar unfortunate results. Personally Dr. Moore felt that the drug was too dangerous to justify its use, although Cady and Alvis believed that it should be used because the good results outnumbered the bad. If it were used, the slightest visual symptoms should cause a cessation of treatment and careful field studies. Our greatest present need was a study of a large series of cases treated by subdural and fever therapy.

M. F. WEYMANN,
Recorder.

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THE ECONOMICS OF GLASSES

The economics of glasses may be seen from three points of view: 1, That of the patient, who seeks relief from disability, or discomfort, to gain and preserve health; 2, That of the physician who seeks the causes of the symptoms, and determines the means for their removal, or prevention; 3, That of the manufacturer and seller of glasses, who seeks to enlarge his business and make it more profitable.

The first concern of the physician is to render the best service to his patient. A profession exists to render service to the community. Poor medical advice is the most expensive thing in the high cost of health. The medical advice that is given free in the advertisements, in the daily papers, or stuck under the front door, costs the public more than the advice they pay for, and this is true of the advice they get about glasses. The good of the wearer is the reason for wearing glasses, and must dominate the choosing and fitting of them.

Patients who come with errors of refraction often know, from experience, the high cost of poor advice. The optometrist, who is most anxious to sell high priced lenses and the latest in frames, can hardly be expected to attach great importance to the accuracy of a scientific measurement. Too often the M.D., who has chosen "Ophthalmic surgery" for his specialty, thinks too little of the importance of ametropia, to give the time necessary for repeated tests of the refraction, even to secure the best results of his cataract operations. But when an accurate correction has been prescribed, the interest of the patient still requires thought. Poor service as to frames may be given by the optician, who seeks his 100 percent profit, by advising the latest style of frames or material; and if the patient seeks for the cheapest glasses that will meet the prescription, the money he may save will really be no saving.

To meet fully the obligation to guard his patient's interest, the doctor who

prescribes lenses must first find what is the best correction and judge if it is likely to give relief, supplement his prescription with instructions as to the careful use of his eyes, and then see that the prescription is taken to a reliable optician who skilfully fits the frames. In the present state of the optical business there are many selling glasses who have little understanding of the fitting of frames, or of its importance. It is therefore necessary for the prescriber to judge of the accuracy of the finished glasses and their mountings; to follow up the wearing of the glasses, and to explain the difficulties that arise from their use. This is the kind of service for which the competent and conscientious ophthalmologist is to be compensated. As adequate compensation is asked and given, good services will be appreciated and expected; and the community will be benefited.

Two dangerous illusions, that the young doctor has to get rid of are, that big fees go with a large operative practice, and that both are desirable. A surgeon who attained high rank in abdominal surgery, went over his books after twenty years of such work, and found that his abdominal sections had brought him an average of ten dollars each. An ophthalmic surgeon who had done two hundred cataract extractions found, that for the operations and post-operative attendance, he received on the average about fifteen dollars apiece. If he operated a second time on the same case he received a smaller fee.

The same attention, time and effort, spent on a refraction case would have given him as large a fee, and generally secured a patient who would return to him, every three or five years, for a similar service. Such patient would actually have been put to less expense, than if he had gone to a dealer who expected to supplement his first sale of glasses by having his customer come back after a few weeks, or months, to have his glasses checked up to see if they could be improved, or, who might be induced by a good salesman, to change his frames every time the manufacturers found it profitable to put a

new style on the market. There is a good economic foundation for the eye physician to serve the community, by conscientious measurement of errors of refraction.

Edward Jackson.

PERFECT SIGHT WITHOUT GLASSES

Because, many years ago, Apostles were sent forth to carry a message throughout the world, and because a modern American faddist flooded Germany and other countries with his faithful disciples, the latter have no hesitation in comparing the late William H. Bates with the sender of those Apostles.

The Prussian Minister of Public Welfare has issued an official document stigmatizing the Bates "schools" as practicing quackery. The patients of this pretender are chiefly to be classed, according to Jaensch (*Klinische Monatsblätter für Augenheilkunde*, 1931, volume 87, page 514) as hysterical and neurotic subjects of the type so easily influenced by another American healer of world fame. Bates himself claimed to cure glaucoma, myopia, hyperopia, astigmatism, presbyopia, cough, hay fever, rheumatism, trigeminal neuralgia, incipient cataract, syphilitic iritis, retinitis, and keratitis, and to relieve the toxic effects of typhoid, influenza, and gonorrhea.

It is rather usual for ethical physicians to treat quacks and quackery as beneath their notice, and to avoid study and discussion of claims and methods regarded as fraudulent or misleading. But mere statements by Prussian Ministers of Public Welfare or by medical organizations that any so-called school of healing practices quackery do not satisfy the general public, and there is grave question whether to ignore completely these false claims is not to fail in our educational duty to the community.

To the scientific ophthalmologist the arguments of Bates and his followers are transparently and ridiculously misleading. To the layman, however, they may sometimes sound plausible.

Most of us know little about the "sight schools" ("perfect vision without

glasses") beyond the fact that they instruct the credulous to perform certain "eye exercises" the purpose of which is to modify the refraction of the eyeball. But Bates presented to the public a supposed group of animal experiments by which he claimed to have proved that accommodation in animals, and also in man, was due to the action of the superior and inferior oblique muscles. The most generous interpretation that can be placed upon his so-called experiments is that they were performed in ignorance of anatomical facts and laboratory technique.

Bates assumed that modern ophthalmologists still believed myopia to arise from increased curvature of the crystalline lens. He was ignorant of the fact that the mechanism of accommodation in fishes is entirely different from that in man and the higher animals. He professed to be able (!) to reunite nerves functionally, immediately after dividing them surgically, in spite of the generally accepted fact that severed nerve fibers do not reunite for days or weeks.

His book (translated into German in 1931) declares that the crystalline lens has nothing whatever to do with accommodation, and it quite ignores the clear demonstrations obtained with the slitlamp. He described a complicated apparatus used for photographing the Purkinje-Sanson lens reflexes; but his illustrations clearly indicate that what he actually photographed were corneal reflexes; and his photographs of alleged changes of curvature of the sclera in accommodation, in myopia, and in hyperopia, in one and the same eye, were obtained by slightly altering the direction of the eye.

We are informed in the Bates volume that all disturbances of vision are based upon strain, the visual center being first affected and gradually the whole retina. The most important curative measures recommended are (1) covering the eyes with the palm of the hand for from several minutes to twenty hours, concentrating on the mental picture of deep black (this procedure having even cured facial paralysis after a mastoid operation!!!); (2) development of the power

of imagination, with the production of illusions of color, size, form, number, and location; (3) rhythmic ocular movements; (4) constant repetition of the reading of the Snellen chart at varying distances and with different illumination (even the aviation pilot is to carry visual test charts with him in his plane for constant practice). As long as the patient retains the mental image of a deep black spot as produced by "palm-ing," all sorts of eye operations can be done without any anesthetic.

A picturesque example of the kind of patient cured by Bates is the physician who suffered from disturbing double vision, and saw people as though they were standing on their heads!

It is not surprising that the "Bates" practitioner, like other types of ignorant quack, soon found it profitable to combine with his particular fads the use of various forms of radiation, ultraviolet and infrared, as well as other methods of physiotherapy and even homeopathy.

Jaensch's thorough analysis of this most inane and unscrupulous system of quackery has here been drawn upon somewhat freely, in the hope that the details quoted may serve to enlighten those puzzled patients who sometimes ply the ophthalmic surgeon with questions concerning the possibility of obtaining "perfect sight without glasses."

W. H. Crisp.

AN AMERICAN INSTITUTE OF OPHTHALMOLOGY

Of the making of books there is no end and the same may be said of medical societies, but nevertheless there is room for one more. The American Institute of Ophthalmology could fill a definite need if such a Society were organized upon the following basis:

(a) A membership of ten members, namely the presidents, vice-presidents, and secretaries of the American Ophthalmological Society, the American Academy of Ophthalmology and Otolaryngology, and the Ophthalmic Section of the American Medical Association.

tion, and a permanent secretary with a five year tenure of office.

(b) The purpose of the Institute to be an agency for studying the problems common to the three societies, representing ophthalmology in the United States of America, and for undertaking such measures as might be authorized by the three component societies.

(c) An annual meeting (preferably at the meeting of the American Medical Association) for the purpose of discussion of the problems and the reports of such committees as may have been appointed from among the members of the three societies for the analysis, of some specific problem.

(d) A chairmanship that would rotate in order between the three presidents of the component societies.

The proposed Institute would be in reality only a liaison committee between the three national eye societies and would have as its function, the study and recommendations resulting therefrom of problems that were both national and ophthalmological in scope. True, such studies would have to be committee work, but the Institute would be empowered to appoint any member of any one of the three societies on any committee. There should be no expense connected with the formation or work of the Institute and hence it should require only the moral support of the three national eye societies.

Harry Gradle.

OPHTHALMIC EXAMINATIONS FOR COMPENSATION PURPOSES

Most states have enacted laws during the past few years governing the compensation of injured workers. This has proved a real advance in classifying injuries and systematizing and insuring awards, thus proving a boon both to employer and employee. As the idea is new it is natural that the legislation is not perfect. Uniform laws would be advantageous. Most of the states have followed closely the recommendations by the committee appointed from the medical societies to formulate stand-

ards for compensation. Most of them, however, possibly from a desire for individuality, have made minor departures from the outline. One of the absurdities included in some of these laws is that of considering the vision without glasses instead of with the patient's correction, the only saving grace in this being the customary acceptance of the fellow eye as a standard for the individual in question. In cases where glasses are important in improving vision, as in myopia, there is usually a considerable similarity between the refraction in the two eyes.

These new laws have had the effect of bringing the matter of workers' eyes more clearly to the attention of industry so that an ophthalmic examination at the time of employment and occasionally thereafter has become increasingly common. This is of great advantage in evaluation of possible later industrial damage.

The commissions are nearly always composed of earnest, conscientious men who are trying to arrive at just estimates of disability. The members are cooperative and intelligent. It is usually a pleasure to appear before these boards and as almost every ophthalmologist must occasionally do so he should have an idea of what information will be expected from him. In general the commissions have a considerable knowledge of the medical aspects of the problem but are anxious to have each case reduced to its simplest form. They particularly desire to know the visual acuity for far and for near, the muscle action, and the visual fields. They usually prefer to estimate the disability themselves.

A report by Dr. M. Davidson for the department of labor of the State of New York published in the industrial bulletin of that department for May, 1931, on the analysis of one thousand eye examinations for compensation purposes is of interest. One of the points made by the author is that 20/20 vision represents in reality only about two-thirds of normal vision and yet is the standard of normal vision in the eyes of the law for compensation purposes. If a man

had 20/15 vision before an accident and 20/20 after the accident he would still be considered as having normal vision although he had lost a considerable percentage of his sight. Furthermore, as the author points out, this acceptance of 20/20 vision tends toward the overlooking of defects such as vitreous opacities, incipient optic atrophies, fundus and other lesions of traumatic origin as well as certain nontraumatic pathologic items, for example, lamellar cataract, interstitial keratitis and chronic glaucoma, which may possibly interfere only in a minor way in the early stages.

Malingering is probably not extremely frequent if the patient is seen promptly after the accident by the ophthalmologist. It is generally when delay occurs and the patient is approached by unscrupulous lawyers that this is found.

Another factor is that of hysteria or neurosis. Davidson believes that these diagnoses should be made only when supported by a neurologist. Lastly, he indicates the advisability of a standard test type and form of illumination. There is an encouraging tendency toward standardization of test types but very little has been done toward standardization of illumination.

The routine suggested for examination of the possibly injured patient is the taking of visual acuity with both eyes open, without correction, immediately upon the arrival of the patient, before questions as to symptoms and the nature of injury are asked. This prevents the claimant from orienting himself and organizing resistance to the examination. By this method the vision of the better eye is noted and this serves as a guide throughout the test. The suggestion is then made that glasses might help the sight and the patient is offered a frame containing a plus three diopter sphere on one side and a plus twelve hundredths sphere on the other and the vision noted. Again suggesting further improvement the lenses are reversed and the vision taken. Although the possibility of the existence of more than three diopters of manifest hyperopia is recognized this is outweighed by the advantage of the lesser blur usually in-

duced by this correction instead of by a higher.

Examination with the ophthalmoscope as to pupils, their reactions, irides, and fundus reflexes follows. Thorough examination of the fundus by indirect method is next. Then retinoscopy to discover finer changes in the media and to determine the refraction is done. The lids and anterior segment are examined by oblique illumination and the motility of the eyes noted. The final test of the vision with the correction found is then made. Special studies, when indicated, such as slitlamp, fields, binocular vision, and color sense are done after this. The minimum test outlined requires an average of fifteen minutes. The author suggests that the most neglected examinations are those of the media with the plane mirror, indirect ophthalmoscopy and use of a mydriatic. However, he apparently does not use mydriasis in the routine examination. He suggests that photographs of the cornea in case of scars would prove valuable permanent records. He further advocates a blank with specific questions and correct diagrams for ophthalmic reports. Undoubtedly this would be exceedingly valuable because the present blanks in most states do not lend themselves to ophthalmic reports.

The commissions are acquiring more exact knowledge. They still at times do not have as informed a viewpoint as they should and occasionally even exhibit a failure of appreciation that may prove quite harmful, as witness the comments on page 499 of the *Journal of the American Medical Association* for February the sixth, on "Tardy development of traumatic cataract." The commission was willing in this case to accept a diagnosis of traumatic cataract on extremely slim evidence. The danger of judgments being rendered in such a case as this and other similar cases and being used thereafter as a precedent can be readily seen. It is, therefore, desirable that decisions be not rendered until all available evidence is in hand and the merit of the case most carefully weighed.

Lawrence T. Post.

BOOK NOTICES

Theodor Axenfeld's Briefe und Tagebuchblätter von seiner Reise zum VIII. Alljapanischen medizinischen Kongress in Osaka, herausgegeben von Helmut Axenfeld mit 25 Abbildungen. (Theodore Axenfeld's Letters with Leaves from his Notebook on his Journey to the Eighth All-Japanese Medical Congress in Osaka, edited by Helmut Axenfeld.) Paper covers, 128 pages, 25 plates. Price RM. 8.80. Published by Von Ferdinand Enke in Stuttgart.

To those who knew Axenfeld only as a great medical teacher this volume will come as a revelation of his many-sided character. His training in accurate observation and his habit of constantly recording his impressions gave to him a facility and a felicity of expression that were most uncommon. His broad culture, his interest in art, in history, in archeology, made every step of his oriental tour one of exceptional interest. To those who were so fortunate as to possess his friendship these letters will be a precious remembrance recalling the very tones of his voice in the directness with which they were written.

He had not been an extensive traveler outside of his own country and his journey around the world on his visit to the Orient was an event of importance. His clinic had been one of the most popular in Europe and it was constantly crowded by students from many lands. These, gathering in the great centers as he traveled eastward, delighted to greet him and to do him honor. One feels it a privilege to be permitted to read the personal letters addressed to his family and to have revealed to us the "Gemüthlichkeit" which they disclose. He was entertained at Alexandria by a large group of ophthalmologists mostly Egyptians, together with those of half a dozen other nations representing the best in ophthalmology. He spent an hour in the Giza Laboratory discussing preparations and methods with Wilson, the director. He met many of his old students among the Chinese ophthalmolo-

gists at Shanghai. A great joy was in the reunion of old friends and former pupils on his arrival in Japan. At Osaka, the first to welcome him was Arisawa who had been with him in Freiburg, and then Naito and Fujiwara, who were among his earlier pupils at Rostock. His Russian colleagues were not less cordial in their greetings, but happy as were these reunions and renewals of old friendships, throughout all of them there seemed to run a vein of sadness. It was almost as if they who had foregathered at these various conferences had a presentiment that the "Hail and Farewell" were final, and that the words of the old master so quietly spoken although filled with good cheer and appreciation of the friendship so warmly expressed by his oriental colleagues seemed to say to them: "I who am about to die, salute you".

On the fourth of March the Ophthalmological Society of Japan met to do him honor. He was the guest of the Japanese Ophthalmological Congress which had in previous years welcomed Hirschberg and Fuchs.

Six months later, at Osaka, with his picture draped and from the same platform from which he had spoken to them, Miyashita sadly delivered his funeral oration. Science has no boundaries and the touch which these letters give us with the Eastern world are of great value in developing that sense of mutual respect and esteem that goes far to break down the barriers of race and language.

The volume is preceded by a very excellent portrait of Professor Axenfeld and the illustrations, especially those of Japan, are exceedingly good. Most American readers will be surprised at the magnitude of the University of Tokio and that at Osaka is enormous in extent. The importance of the medical work that is accomplished in the Orient may be realized when we know that the most modern methods are employed in both of these institutions.

A brief preface is written to these letters by Helmut his son who accompanied him in his journey around the world. The little volume is from the

press of his old friend, Ferdinand Enke, publisher of the *Monatsblätter für Augenheilkunde* of which for thirty years he had been the editor. To those who read German these last words of this great ophthalmologist will give some very delightful hours.

Park Lewis.

Giza Memorial Ophthalmic Laboratory.

Fifth Annual Report, 1930. Rowland P. Wilson, Director. Paper, 8vo, 102 pages, with 15 plates. Department of Public Health, Schindler's Press, Cairo, 1931.

This laboratory is the most striking example of the establishment of modern ophthalmic medicine in the stronghold of ophthalmias, in Egypt. Making pathological examinations for the different ophthalmic hospitals, permanent and traveling, that have been developed since Britain became actively interested in the well-being of Egypt; its reports are interesting on account of what they contain regarding ophthalmopathology. Its facilities for graduate study and research work begin to attract workers from America; and the annual meeting of the Ophthalmological Society of Egypt is held there usually in March.

The details of work done in the pathological laboratory give an instructive view of the practical attainments and progress of ophthalmology at this time. There are 118 enucleated eyeballs, reported on histologically; of which 81 were blind, staphylomatous eyes, with secondary glaucoma. There were 981 bacteriological reports, on smears from the conjunctiva; and 107 such examinations for eosinophilia, 50 of them positive. The pathological specimens examined number 502.

The detailed reports which occupy 70 pages, cover a wide range of subjects, including: tuberculosis and sarcoma of the lacrimal gland, dermoid cyst arising from a hair papilla, sebaceous cyst of the caruncle, dermoid cyst of the conjunctiva, containing cartilage, epithelioma of the limbus in a child of 12 years, and phthisis bulbi, due to in-

tra-uterine inflammation. Among clinical cases one is reported of transient edema of the macula, three of ophthalmoplegias, one of bilateral inflammatory pseudo-tumor, and one of gliomatosis of the optic nerve. The research reports include one on trachoma and its treatment with tragynol, spring catarrh and its treatment, corneal tattooing and use of ultraviolet radiations. There is also a discussion on the etiology of trachoma with special reference to the Noguchi bacterium granulosus. These Reports constitute a valuable addition to any ophthalmic library.

Edward Jackson.

The Fifth Annual Report of this laboratory which was forwarded to the Department of Public Health, April 18, 1931, is of the same excellent character as those which have preceded it. The rich clinical material which this region supplies has been admirably utilized. Postgraduate lectures and ophthalmological clinics are given in the spring and fall and these are developing a high degree of efficiency in the Egyptian ophthalmic service. A course is provided for medical officers joining the ophthalmic section of the Department of Public Health in which a high standard of requirement is maintained. It is noted with interest that the percentage of preventable blindness is steadily diminishing year by year. Pathological findings in blind eyes showed that in 1927 the number of lost eyes that might have been saved was eighty-one percent of the total while in 1930 the proportion had been reduced to sixty-two percent. A number of unusual conditions were reported which are not common in temperate regions. Among these were three cases of "*Schistosoma Mansoni*" (a report upon the eye conditions of which would have been interesting) and two of *Wohlfahrtia Magnifica*.

Much attention has been given to research on the bacillus granulosus, strains of which had been received from the Rockefeller Institute. Two American workers came to study trachoma in Egypt at this laboratory, Dr. F. I. Proc-

tor of Boston and Dr. Phillips Thygeson of Denver.

An interesting method of tattooing the cornea (which rather should be considered as staining the cornea) is described in which a black pupil is obtained by the use of a two percent solution of platinum chloride. The report is printed on good paper and the plates are excellent. *Park Lewis.*

Ophthalmolo- und Oto-Neurologie (Ophthalmic and otic neurology), a textbook for students and physicians. By E. A. Spiegel of Philadelphia and Vienna, and Ignaz Sommer of Vienna. 366 pages, 87 illustrations, partly in color. Price, paper covers, 28 marks, bound 29.60 marks. Vienna and Berlin, Verlag von Julius Springer, 1931.

As to symptomatology and diagnosis there is a most important relationship between ophthalmology and otology on the one hand and neurology on the other, and it is scarcely more necessary for the neurologist to be versed in details concerning eye, ear, nose, and throat than for the ophthalmologist or rhinologist to appreciate the neurological foundations and implications of disturbances in his own particular field. There is a real need for convenient works of reference which will serve this interrelationship, and such need Drs. Spiegel and Sommer have undertaken to satisfy in the present volume.

A brief preface speaks of the work being a reproduction of "unsere postgraduate lectures", and the preface is dated as from Vienna and Philadelphia; so that we are led to suppose that a good deal of the contents of the present volume is based upon postgraduate lectures delivered in the United States. The volume is said to have been prepared largely in response to repeated expressions, by hearers, of a wish that the lectures might be obtainable in print.

The rapid developments of the last few decades in the neurology of eye and ear are for the most part scattered throughout the periodical literature.

Spiegel and Sommer therefore propose "to acquaint ophthalmologists and otologists with neurological local diagnosis, in other words with the recognition and treatment of nervous symptoms and complications accompanying diseases of the eye and ear, and the neurologist with the use in differential diagnosis of otologic and ophthalmic methods, having special regard to recent theoretic bases of this field of study, as well as the incidental therapeutic measures". The neurology of nose, mouth, throat, and larynx is reviewed.

In accordance with the didactic character of the volume, the text is clarified by the use of various schematic drawings. Each chapter carries an indication of the most recent literature on its particular topic. A carefully prepared index of fifteen pages adds greatly to the reference value of the work.

A very important first chapter of seventy-eight pages is devoted to the local symptoms arising from the brain stem and the cerebrum, classified under a dozen anatomical subheads. The second chapter is concerned with the cerebrospinal fluid, its origins and circulation, and the diagnostic significance of lumbar puncture, particularly in diseases of the eye and ear. The titles of the remaining chapters are as follows: (3) The optic tracts and centers and their symptomatology; (4) The ocular fundus in diseases of the nervous system and of the ear; (5) Ocular movements and their disturbances; (6) The smooth muscles of the eye and of the orbit, their reactions and their pathology; (7) The sensory apparatus of the eye and its disturbances; (8) The organ of hearing, its functional tests and its disturbances; (9) The labyrinth, its functional tests and its disturbances; (10) Disturbances of innervation in the region of the nose, the oral cavity, the throat, and the larynx; (11) Neurological complications and diseases of the ear and accessory sinuses.

After reading a technical work of this kind the reviewer is disposed to emphasize the desirability of broad internationalism rather than narrow nationalism in technical terminology. Perhaps

questions of this kind will some day be referred to a special organization under the League of Nations. In some instances medical German uses words of native origin where the English language of anatomy employs words of classical derivation. Thus the word "pons", so universally found in our own medical writings, is commonly rendered in German as "Brücke" ("bridge"); and in such a case Americans whose acquaintance with German is somewhat sketchy are apt to be led into queer mistakes, for their grasp of Latin and Greek as applied to technical terms is likely to be rather weak and unimagina-tive. On the other hand, German writers sometimes seem fairly to gloat over the use of pure Latin (or scientific neo-Latin) for long descriptive titles of diseases. The amusing feature of this latter tendency is that it appears to be just as frequent now as before the war in spite of the belligerent enthusiasm displayed by some German writers for the ingenious construction of new, native German, compound names for medical terms which had previously been expressed in forms adapted from Latin, Greek, or particularly French.

W. H. Crisp.

Cirurgia ocular (Ocular surgery), volume one. (In Portuguese.) By Dr. W. Belfort Mattos. Paper covers, 109 pages, freely illustrated. Price not stated. Published for the author by Imprensa Methodista, Sao Paulo, Brazil, 1931.

In 1930 the National Academy of Medicine of Brazil awarded this work the prize in the first competition held on the basis of a fund established by Gabriel Andrade in honor of Moura, a distinguished Brazilian physician. The present volume is a well written and profusely illustrated series of descriptions of the technique used by the author in operations for senile and soft cataract, corneal leucoma, serous cyst of the iris, ocular cysticercus, acute and chronic glaucoma, epibulbar tumors and pterygium, tumor of the optic nerve, trachoma, entropion and trichiasis, and

spasmodic entropion, as well as a discussion of palpebroconjunctival autoplasty, surgery of the lacrimal passages, discission, and treatment of intraocular foreign bodies.

W. H. Crisp.

Stereoskopischer Atlas der ausseren Erkrankungen des Auges (Stereoscopic atlas of external eye diseases). By K. Wessely, Professor in Munich. 4th. Series. Published by J. F. Bergmann.

This is the fourth of the series of colored stereoscopic photographs of diseases of the external eye and is fully up to the standard set by the preceding series. The conditions shown are: pterygium, epithelial tumor of the limbus, lacrimal fistula following injury, xerophthalmos following trachoma, melano-sarcoma of the choroid, tuberculous iritis, zonular cataract, calcified luxated lens, metallic foreign body in anterior chamber, and vaccinia of the eyelids. The photographs are actual stereos in color, reproduced by a new process that permits of high color fidelity except in the higher magnifications where the grains of the photographic emulsion become too plainly visible. Needless to say, the reproductions of the clinical processes are absolutely accurate and the colors add much to the teaching values. On the back of each plate is a short description of the case in English, German, and French.

Harry Gradle.

Bulletin de la Société Belge d'Ophtalmologie, No. 62. Analytic report of the 26th reunion of the Society at Brussels April 26, 1931. Paper covers, 76 pages.

This bulletin includes 15 papers and case reports read before the Society, together with discussions.

Among them are "The persistent pain of zona ophthalmica", by J. Badot; "The nasal nerve syndrome", by Wibot; "Reflections on a case of chronic glaucoma. Technique of Kait and retrobulbar di-nin injections of Weekers", by Marbaix; "New applications of retrobulbar injection", by Kleefeld; "On the pseudo sign

of Graefe (Fuch's sign)", by H. Coppez; "A new direction in the treatment of retinal detachment", by R. Rubbrecht; "Trachoma in Belgium, and the foreign workman", by R. Hubin and J. Hubert; "The action of irritating substances on choroid and retina", by Rubbrecht and DeJaeger; "University instruction for specialists. The certificate of specialist", by Professor L. Weekers of the University of Brussels; "Radiography of the lachrymal passages before and after the dacryocystorhinostomy of Dupuy-Dutemps", by L. Coppez and A. Meyers.

Three of the papers are illustrated with drawings and photographs. Some of the papers will be reviewed later in the Abstract Department of this Journal.

J. B. Thomas.

Précis D'Ophthalmologie. (Abstract of ophthalmology.) By Dr. V. Morax. Fourth edition, revised, 1931. Edited by Masson et Cie., Paris, 896 pages, 450 illustrations, 4 colored plates, bound, price 90 francs.

This new edition of Dr. Morax' textbook contains a large amount of material amply illustrated. The additions to this edition are the descriptions of new technique such as that of dacryocystorhinostomy, ptosis operation, slitlamp and others. Some changes have been made in the figures and new ones added. The pages are somewhat smaller than those in most English textbooks but the amount of material is large because of the small type used. The paper and illustrations though not ideal are adequate.

Lawrence T. Post.

Medical social service in eye clinics.

Transactions of the first of a series of study meetings arranged by the Committee on Development of Social Service in Eye Clinics of the Medical Social Service Section of the Welfare Council of New York City. Paper, 143 pages, mimeograph.

This is the record of monthly study meetings of ophthalmologists and so-

cial workers in New York City, from December, 1930, to May, 1931. The papers on ocular subjects, by numerous physicians, have been dealt with in full. Because of space limitation the presentations of the social workers have not been recorded except in a summary of the discussions.

Of the forty-seven eye clinics in the New York Metropolitan area, approximately ten had medical social workers attached to their services in 1930. These meetings were undertaken in the hope of impressing doctors, social workers, and laymen with the inadequacy of this service and the desirability of extending it. In how far they have been successful in accomplishing this as yet, is not known. Certainly they succeeded in enlisting the cooperation of an extremely able group of ophthalmologists.

Of necessity the ophthalmological discussions are elementary and the interest lies rather in the undertaking than in any contribution made to ophthalmology. Unquestionably the efficiency of the ophthalmic clinic is enormously increased by adequate social service cooperation and everything that can be done to promote this relationship is deserving of support.

Lawrence T. Post.

OBITUARY

Theodore B. Schneideman
1861-1931

His parents having come from North Germany to Philadelphia, Dr. Schneideman was educated in the schools of that city; and at Princeton College, where he gained a fine knowledge of mathematics, and worked with Professor Young. His medical training was gained at Jefferson Medical College, where he received his M.D., in 1883. His knowledge of optics naturally turned his attention to ophthalmology. He was placed in charge of the eye service at St. Christopher's Hospital for Children, and soon after became a clinical assistant at the Philadelphia Polyclinic. His faithful performance of every duty, and keen interest in teaching, rapidly

brought promotion to Chief of Clinic, Instructor, Adjunct Professor, and in 1897 Professor of Ophthalmology, in that institution. He was, also, Assistant Surgeon at Wills Hospital from 1890 to 1898.

His knowledge of optics made him the first to appreciate and teach the use of the cross-cylinder, as a practical advance in the measurement of refraction. Although he had good surgical judgment and operative skill, he had no ambition to be known as a great operator; but devoted his attention rather to refraction, muscle anomalies and the medical aspects of ophthalmology. He read widely, and his excellent knowledge of French and German made him a valuable contributor and collaborator in the conduct of ophthalmic journals. He became the first collaborator to assist the editors of the *Ophthalmic Year Book* in 1907, and continued his editorial assistance until it was finally embodied in the *American Journal of Ophthalmology*. As a collaborator of this journal he continued his interest in it and service to his profession, until the last year of his life.

From the beginning of his professional career he took an active interest in general and special medical societies. He became a member of the American Academy of Ophthalmology and Otolaryngology in 1904, and continued a member until his death. He joined the American Ophthalmological Society in 1898, and resigned his membership in 1930 because of inability to attend its meetings. His activity in society meetings may be gathered from the list of his published papers. He was never a voluminous writer, and only wrote when he had something worth bringing to the attention of the profession. His abstracts, prepared for the *Ophthalmic Year Book* and this *Journal*, illustrate his clear and accurate thinking, his unusual selective judgment of what was important, his careful translation, and his mastery of English.

Dr. Schneideman had a good preliminary education; and with his keen sense of medical ethics quickly came to appreciate his professional responsibil-

ity toward every patient. On this basis he quickly gathered a good practice, and his patients continued to return for his advice over long periods of years. His duties as a practitioner limited what he might have done in other directions. But his colleagues who came to know him well will continue to respect and think of him as a true member of the medical profession, whose conduct was an honor to it. Below is given a list of his more notable contributions to medical literature:

- Ointment of yellow oxide of mercury.** Philadelphia Polyclinic, 1892, p. 118.
- Acute inflammation of lacrimal sac.** Phila. Polyclinic, 1893, p. 318.
- Spontaneous absorption of cataract.** Phila. Polyclinic, 1894, pp. 334-336.
- Report of Eighth International Ophthalmological Congress,** Edinburgh, August, 1894. Phila. Polyclinic, 1895, pp. 336, 345, 354, 365.
- Opacity of lens after injury.** Reports of Wills Hospital, v. 1, 1895.
- Clinical Lectures:** Extraction of cataract, Optic neuritis, Glaucoma. Phila. Polyclinic, 1895, p. 141-143.
- Skiascopy, Phila. Polyclinic, 1895, p. 406.
- Antisepsis and asepsis in ophthalmic surgery. Phila. Polyclinic, 1897, p. 276.
- Operative treatment of high myopia. Phila. Polyclinic, 1897, p. 289.
- Pupillary inequality in health and disease. Phila. Polyclinic, 1898, pp. 14-18.
- The crossed cylinder. *Ophthalmic Record*, 1900, p. 169.
- Central superficial choroiditis. *Ophthalmic Record*, 1904, p. 413.
- Spontaneous hemorrhage into vitreous. *Trans. Amer. Academy of Ophthalmology and Otolaryngology*, 1905, p. 109.
- High hyperopia. *Trans. Amer. Acad. Ophth. and Oto-Laryngology*, 1906, p. 125.
- Pseudo-optic neuritis. *Ophthalmic Record*, 1908, Nov.
- Double paralysis of motor oculi. *Trans. Amer. Acad. Ophthalmology and Oto-Laryngology*, 1909, p. 211.
- Paralysis of third nerve in both eyes. *Ophthalmology*, 1910, p. 428.
- with Howe, L. and Hansell, H. F. Report of Committee on collective investigation concerning ocular muscles. *Trans. Section on Ophthalmology, Amer. Med. Assn.*, 1921, p. 311.
- with Hansell, H. F. Luetic ophthalmitis. *Trans. Amer. Ophth. Soc.*, 1922, p. 270.
- Correction in ametropia and heterophoria. *Atlantic Med. Jour.*, 1925, p. 150.

Edward Jackson.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

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| 1. General methods of diagnosis | 9. Crystalline lens |
| 2. Therapeutics and operations | 10. Retina and vitreous |
| 3. Physiologic optics, refraction, and color vision | 11. Optic nerve and toxic amblyopias |
| 4. Ocular movements | 12. Visual tracts and centers |
| 5. Conjunctiva | 13. Eyeball and orbit |
| 6. Cornea and sclera | 14. Eyelids and lacrimal apparatus |
| 7. Uveal tract, sympathetic disease, and aqueous humor | 15. Tumors |
| 8. Glaucoma and ocular tension | 16. Injuries |
| | 17. Systemic diseases and parasites |
| | 18. Hygiene, sociology, education, and history |

9. CRYSTALLINE LENS

Cirincione, G. **Leaves from an unfinished treatise on ophthalmology. Diseases of the crystalline lens.** Ann. di Ottal., 1931, v. 59, Aug., p. 675.

At the time of his death Professor Cirincione left more than a thousand pages of what he had planned to be a complete treatise on ophthalmology. From time to time extracts from this work have been published in the "Annali di Ottalmologia e Clinica Oculistica," of which he himself was the founder. The subject of "Glaucoma" was carried through several issues of the "Annali" last year. "Cataract," which is discussed in eleven pages of this issue, shows the meticulous care with which all of Cirincione's papers were written, as well as his extensive knowledge and the discrimination and judgment with which he drew on his vast experience. In these pages he treats of the development of the lens and the changes which it may undergo, the etiology of cataract, congenital and acquired, and its pathology. The work is not a compilation but is the product of the author's clinical, scientific, and didactic activity. In reading these selections our regret is intensified that

this great master should have been taken away at the zenith of his most useful career.

Park Lewis.

Corrado, M. **Glaucoma following penetration and proliferation of epithelium in the anterior chamber of eyes operated on for cataract.** Ann. di Ottal., 1931, v. 59, Aug., p. 706.

In the cases reported the pathology was carefully studied, and they are illuminating in showing the mechanism by which the epithelium finds its way into the anterior chamber, where the proliferation obstructs excretory channels, making increased tension inevitable. In one case noted, nothing worthy of special attention had occurred during the operation for cataract. Two weeks later the eye continued to be red and irritable, with marked photophobia and diminishing visual acuity. Notwithstanding the use of pilocarpine, at the end of some months the eye had become blind and was removed. By this time a sulcus occupied the site of the operative wound, and was filled with neoplastic tissue. Epithelial cords extended from the base of the scar backward to the remnant of the capsule and anteriorly to the cornea, and thence to the

margin of the pupil. The ciliary body was part of a compact mass, the muscle being almost wholly atrophied. The extension of the epithelium over an extensive area, obliterating the excretory passages of the eye, had caused a secondary glaucoma followed by changes in the structure of the iris, the choroid, the ciliary body, and the optic nerve. Other confirmatory cases are reported. Experiments were made on the eyes of rabbits to determine the manner in which the epithelium entered the wound and prevented physiologic functioning of the eye. A vital strip of epithelium, once having entered the anterior chamber, rapidly proliferates. (Bibliography, plates.) *Park Lewis.*

Gizedzielski, Jerzy. **The capsular lamella of the lens in glaucoma.** (*Glaucoma capsulare Vogt.*) *Graefe's Arch.*, 1931, v. 126, p. 409. (See Section 8, Glaucoma and ocular tension.)

Kaplan, Judith. **Lens opacities in glass-workers.** *Graefe's Arch.*, 1931, v. 126, p. 443.

Among 850 furnace workers it was found that nine percent developed lens opacity, whereas in 509 control cases five percent showed cataract.

When the 850 furnace workers and the 509 control patients were divided into those under and those over forty years of age, 5.2 percent of the 700 furnace workers under forty years had cataract as compared with 3.6 percent among 366 control cases under forty years. Among 150 furnace workers over forty years 26.6 percent had lens opacity as compared with 10.4 percent with lens changes among 143 control cases over forty years of age.

Among 469 furnace workers employed at this work for less than ten years, 6.6 percent developed cataract, the same as in 180 employed for periods varying between ten and nineteen years, while of 201 furnace workers employed for over twenty years 16 percent showed lens opacity.

Comparing the incidence of lens changes in 525 furnace workers occupied close to the furnace with that among 325 helpers not in near contact

with the heat, 11.4 percent of the former had cataract and 5.8 percent of the latter. *H. D. Lamb.*

Kewalram, B. I. **Mercury lotion and cataract operation.** *Madras Med. Jour.*, 1931, v. 13, April, p. 124.

Kewalram recommends the Herbert Bamber method in which a half-hour before the operation 1/3,000 mercury bichloride is allowed to strike the eye from a height of eighteen inches for a period of two minutes. This washing may produce a filamentary keratitis in which little threads of epithelium are seen hanging from the cornea at the first dressing after the operation.

Ralph W. Danielson.

O'Brien, C. S., and Salit, P. W. **Iso-electric point of lens protein.** *Arch. of Ophth.*, 1931, v. 6, Dec., pp. 870-876.

The findings of various observers relative to the iso-electric point of lens protein fall roughly into two groups. This diversity of results is probably due in large part to insufficient appreciation of the necessity for complete saturation of the tissue under examination in order that the reaction of the surrounding fluid may be the same as that within the tissue. A method directed toward correcting this error is described in detail. By it the iso-electric point of the protein in the whole lens of one-year-old cattle was found to be pH 5.16; that of the nucleus was pH 5.44 and that of the cortex pH 5.10.

This investigation was undertaken in an effort to throw light on the cause of diabetic cataract. In diabetes the aqueous reaction is shifted toward the acid side. The acetone bodies, also present, result in inhibition of the activity of peroxidases, hemolysis of the blood, and precipitation of the proteins of the blood. Only 2 pH units difference is found between the normal reaction of the lens and the iso-electric point of its protein. Indeed, as soon as the crystalline structure of the lens is destroyed, a portion of the lens protein precipitates at a normal pH . In diabetes, therefore, damage to the crystalline structure and precipitation of the

protein by acetone bodies follow the lowering of the intraocular pressure from the diuretic action of the accumulated sugar, as a consequence of which the lens fibers shrink and opacities form.

M. H. Post.

Rauh, Walter. The development of "swarm of bees cataract" in comparison with the experimental cataract of tetany. Graefe's Arch., 1931, v. 126, p. 256.

In the rat, "swarm of bees cataract" is a postnatal kind of cataract which begins subcapsularly with opaque dots. The form of the cataract is dependent upon the time of appearance of the opaque dots; in the earlier time, between the nineteenth and twenty-third day post partum, a deep feathery "swarm of bees cataract" is observed; in the later period, beginning at the fifth week and occurring in varying attacks up to the fourth month, there is found a superficial cortical "swarm of bees cataract". The individual opaque dots arising subcapsularly may progress to vacuoles by deeper extension; after a certain time these vacuoles may again retrogress.

Spontaneous postnatal "swarm of bees cataract" shows in its development an astonishing similarity with the experimentally produced cataract of tetany in the rat. The etiology of "swarm of bees cataract" may be hereditary, or it may be due to inner secretory disturbances in the sense of an idiopathic tetany whose transmission is possibly hereditary.

H. D. Lamb.

Saveliev, S. V. On the conjunctival bridge in cataract extraction. Archiv Ophthalmologii, 1931, v. 8, p. 280.

The author used the conjunctival bridge in fifty-eight of the one hundred and ninety-five cataract cases which were operated upon during the year 1930. He considers this method a distinct improvement in the technique of cataract extraction. The bridge should be formed in a vertical direction, and with a sufficiently wide base, insuring more accurate apposition and better

nutrition of the lips of the wound. As compared with sutures, the conjunctival bridge is a simpler and shorter procedure, insures greater safety during the operation, and also less irritation of the eyeball during the postoperative period.

In the preparation of cataract patients, Saveliev stresses the importance of eradicating oral sepsis, contrary to the opinion and practise of most European operators.

M. Beigelman.

Schläpfer, Hans. Remarks on Goldmann's paper: "Critical and experimental researches on the so-called infrared cataract of rabbits and on heat cataract" (Graefe's Arch., 1930, v. 125, p. 313). Graefe's Arch., 1931, v. 126, p. 336.

The most important error which pervades Goldmann's work is his lack of mention of the posterior opacities in the lens which, lying in the path of the infrared rays, could hardly leave an impartial person in doubt of direct action of the rays upon the lens cortex. These posterior opacities are the farthest possible removed from the iris and they appear before anterior lens opacities. All of Goldmann's experimental results and conclusions are the results of inadequate technique, for long experience at the Zurich clinic has proved that research with infrared rays demands exact technique.

H. D. Lamb.

Towbin, B. G., and Adamyk, W. E. The histologic changes in blepharochalasis. Graefe's Arch., 1931, v. 126, p. 367. (See Section 14, Eyelids and lacrimal apparatus.)

10. RETINA AND VITREOUS

Adler, F. Heed. The metabolism of the retina. Arch. of Ophth., 1931, v. 6, Dec., pp. 901-905.

Experiment has shown the blood sugar of cats to be 135 mg., that of the aqueous 113 mg., but that of the vitreous only 64 mg. per gm. This low figure for the vitreous appears to be the result of retinal glycolytic action. To determine this fact, atrophy of the

retina was produced by sectioning of the optic nerve, when increased concentration of sugar in the vitreous was found, confirming the hypothesis previously formulated. *M. H. Post.*

Amsler, M. **Observations on Gonin's operation.** Arch. de Oft. Hisp.-Amer., 1931, v. 31, Dec., p. 664.

This is a running commentary upon Gonin's theory and method. Gonin's doctrine that there is no idiopathic retinal detachment without a tear is a hypothesis first glimpsed by de Wecker in 1870, elaborated by Leber in 1882, recently supported by results of operation. Gonin believes that the vitreous, by vitreoretinal adhesions and traction, furnishes the clue to the production of the tear. A purely retinal origin of the tear is possible. The objection that new retinovitreous adhesions may be promoted by the trauma of ignipuncture is groundless, and the loss of vitreous attending it seems harmless. The writer has operated on 40 out of 115 cases examined, with 20 complete readhesions and 4 cases objectively and subjectively improved. We should remember that a Gonin operation does not cure all detachments, not even all those apparently favorable, and that it sometimes makes matters worse.

M. Davidson.

Colenbrander, M. C. **The localization of retinal tears.** Graefe's Arch., 1931, v. 126, p. 424.

The author recommends the use of the hand perimeter of Schweigger. While holding the perimeter before his eye, the patient fixes with the affected eye the mirror of the ophthalmoscope held at the start at the center of the perimeter arc or, if the vision of the eye is too low, he attempts to look at his finger held at the mirror. The middle point of the perimeter arc is thus brought in line with the center of the pupil and the vertical support of the perimeter is parallel with the vertical meridian of the eye. With the pupil dilated, the meridian and the angle along the meridian at which the retinal tear is located are determined by observation

through the ophthalmoscope movable along the arc of the perimeter. The distance in millimeters of the retinal tear from the limbus corresponding to various angles along the perimeter arc is readily found from tables given by the author. *H. D. Lamb.*

Collier, W. T. **Two cases of Lindau's disease.** Brit. Med. Jour., 1931, July, p. 144.

In this disease a vascular neoplasm of the central nervous system below the tentorium, sometimes called a hemangioblastoma, may be associated with angiomas of the retina and malformations or tumors of such abdominal organs as the pancreas and kidney. Only when angioma of the retina is present can the diagnosis be made before operation.

Two cases are described in sisters, one sixteen and the other twenty-one years of age. In the first case there had been a history of severe intermittent headache for two or three years, with occasional nausea and vomiting. Examination showed papilledema of both eyes. Because of an albuminuria, a diagnosis of albuminuric retinitis was made. Later examination revealed that the albuminuria was of the orthostatic type. After decompression the patient developed bronchopneumonia and died. An encapsulated vascular tumor was found in the medulla, and there was a hypernephroma of the kidney.

The second patient also complained of severe headaches and throbbing at the back of the neck, which progressively became worse. Vertigo and an uncontrollable vomiting occurred later. Examination of the eyes was entirely negative. This patient also died of bronchopneumonia, and postmortem examination showed a vascular tumor of the cerebellum and a hypernephroma.

In neither of these cases was the diagnosis made during life and in neither was an angioma of the retina observed macroscopically. *M. E. Marcove.*

Espildora Luque, C. **Cephalic arterial hypertension.** Ann. d'Ocul., 1931, v. 168, Nov., pp. 923-931.

Eighteen case reports are given in brief. See below, abstracts from papers in Spanish by the same author.

Espildora Luque, C. **Retinal arterial hypertension in general hypertension.** Arch. de Oft. Hisp.-Amer., 1931, v. 31, Aug., p. 456; Sept., p. 487; and Dec., p. 657.

(See also preceding item.)

(August) Retinal hypertension as measured by the Bailliant ophthalmodynamometer is found in those with general hypertension as well as in persons with normal blood pressure. The general hypertension may not manifest itself even though the retinal hypertension be already productive of symptoms. The cephalic symptoms accompanying retinal hypertension are nocturnal occipital headaches, tinnitus, vertigo, fainting spells, amnesia and epistaxis. The ocular symptoms include muscae volitantes, photopsias, at times cloudiness of vision, and at times transitory blindness. The systolic Bailliant reading, which is more important than the diastolic, may reach and exceed the brachial systolic level, and a very high systolic retinal hypertension is compatible with perfectly normal appearance of the retinal vessels. An angiospasm in the course of a retinal arterial hypertension may result in permanent occlusion of a vessel without the necessity of postulating an embolus or a thrombus, as shown by one of the writer's cases.

(September) A relative, and sometimes absolute, autonomy of the cerebral circulation may be postulated on the basis of the curious arrangement of the circle of Willis, the terminal character of its arteries, and the special sympathetic innervation of its territory from the internal carotid; and this autonomy is clinically demonstrated by observation of retinal arterial tension. Regional vascular hypertension is not uncommon. Westenhofer, in a personal communication, says: "At autopsy persons are found with cerebral arteriosclerosis without noticeable sclerosis in the other arteries, and this is more common than the reverse." A type of

pure retinoencephalic hypertension exists, without permanent general or regional hypertension, but with transient hypertensive crises, not diagnosed by brachial sphygmomanometry, which may be normal. Exploration of retinal arterial tension in such cases establishes the diagnosis. Solitary retinal hypertension may be classified as meningoencephalic, ocular, and vascular or medical. A subconjunctival hemorrhage demands investigation along these lines. (Twenty detailed case histories.)

(December) While studies are still to be made in detachment of the retina and in primary optic atrophy, retinal arterial tension has been studied in chronic simple glaucoma and rhinogenous retrobulbar neuritis. When the intraocular and venous pressures are equal, we get the spontaneous venous pulse, and when the intraocular tension continues to grow and equals the diastolic arterial pressure, the spontaneous arterial pulse appears. We have therefore the congested type of glaucoma with obstruction of the venous circulation, and the ischemic type in which the arterial circulation is disturbed. Two cases illustrated the behavior of retinal tension in glaucoma, two cases illustrated the relation between retinal tension and symptoms in rhinogenous retrobulbar neuritis, and in four cases valuable differential diagnostic elements were furnished by a study of the retinal arterial tension. In one case among the latter, a problem in differential diagnosis between post-traumatic proliferating retinitis and nontraumatic vascular etiology was decided in favor of the former by the retinal arterial tension, which proved to be normal.

M. Davidson.

Espildora Luque, C. **Solitary retinal hypertension of meningoencephalic origin.** Arch. de Oft. Hisp.-Amer., 1931, v. 31, Oct., p. 537.

Since forty-six percent of cases of intracranial growth do not show choked disc, and lumbar puncture may show normal tension because of block, a study of the retinal circulation by Bailliant's method furnishes means of

earlier diagnosis. While there is no absolute parallelism between them, retinal arterial tension is a reliable guide to intracranial tension. Whatever the mechanism, all observations point to a decided diastolic retinal hypertension accompanying intracranial hypertension, which disappears when papilledema sets in. A differential diagnosis may be made between retinal hypertension due to general vascular hypertension and that due to intracranial hypertension, (1) by the fact that in the former it is the systolic tension that is elevated, (2) by the presence of retinal hemorrhages, and (3) by the tibial blood pressure and absence of cephalic symptoms. (Seven case reports.)

M. Davidson.

Evans, J. N. **Retinal perivascular delineation.** *Arch. of Ophth.*, 1931, v. 6, Dec., pp. 823-839.

In 1867 Professor Wilhelm His presented evidence of an experimental nature concerning the existence of a retinal perivascular space. Many investigations followed, but no real delineation of a perivascular space was given. From experiments described in detail, the author concludes that isotonic solutions, when injected into the vitreous under the given conditions (conditions closely resembling the normal), penetrate the pericellular and perivascular regions. While particles of the dye used were found located about the vessels and cells, it does not necessarily follow that they lay in a formed space, or that their passage from vitreous to retinal and nerve spaces indicated the direction or rate of normal fluid flow.

M. H. Post.

Fischer, F. P. **Retinal localization with reference to the vertex of the cornea.** *Klin. M. f. Augenh.*, 1931, v. 87, Nov., p. 577. (Ill.)

Fischer repeats the description of his localization ophthalmoscope from the *Zeitschrift für Ophthalmologische Optik*, volume 19, page 100, with illustration. It consists of a perimeter with Gullstrand's hand ophthalmoscope and an appliance to fixate and measure the

corneal vertex at the site of the center of curvature of the arc of the perimeter. The use of the instrument during the last nine months has very much facilitated the localization of retinal holes.

C. Zimmermann.

Hartman, E., and Sourdille, G. **Lindau's disease: angioma of the cerebellum in the mother, Hippel's disease in the son.** *Ann. d'Ocul.*, 1931, v. 168, Nov., pp. 881-890.

The kinship of eye and brain, as indicated by anatomy, histology, and embryology, is further confirmed by certain congenital anomalies.

In February, 1930, a male, aged twenty-four years, demonstrated angiomatosis retinae in the right eye. The vision was diminished but had been normal in 1926. No evidence of intracranial tumor could be found. The second patient, aged forty-seven years, and mother of the first, was seen in June, 1930, complaining of severe occipital headaches. Central vision was slightly lowered. The fundi were normal except for slightly blurred discs. By November, 1930, the discs were frankly choked. Upon craniotomy a large angioma was removed from the right cerebellum. When the two cases were considered together, it was felt that both were suffering from Lindau's disease. The father of the second patient had died of a disease of the nervous system, and a brother and a sister of the second patient had died of a condition diagnosed as meningitis.

Photomicrographs of the cerebellar tumor and two colored plates of the retinal tumor accompany the article.

H. Rommel Hildreth.

McKee, S. H., and Rabinowitch, I. M. **Lipemia retinalis.** *Canadian Med. Assoc. Jour.*, 1931, v. 25, Nov., p. 530.

McKee and Rabinowitch report a case of lipemia retinalis, the forty-second on record including Joslin's two new cases. The level of blood fat at which the condition disappeared was below that previously recorded. Blood fat analyses and other data obtained daily and correlated with ophthalmo-

scopic examinations suggest that the condition is also influenced by factors other than the degree of lipemia. The condition that theoretically leads to lipemia, namely, a general cachectic condition affecting all cellular functions, including permeability, is suggested as a contributing factor. (Jour. Amer. Med. Assoc.)

George H. Stine.

Magitot, A. **Tonoscopy.** Arch. of Ophth., 1931, v. 6, Dec., pp. 852-869.

Tonoscopy is the "method by which one evaluates the blood pressure in the vessels of the retina". The present paper is a review of this method and the results obtained through its application. Its value is based upon the close parallelism between the retinal and uveal circulations and the pressure in each. The method of making observations is described, the various applications pointed out, and some of the phenomena reported. The relative values of arterial and venous tonoscopy are compared and their limitations noted. The relation between tonoscopy and intracranial hypertension is studied in detail as well as its application to various ocular diseases. The author feels that much interesting information has been obtained concerning the ocular and intracranial circulations, and that it has supplied the neurologist with early and valuable information as to the state of the intracranial pressure. The author is of the opinion that tonoscopy is of value and will undoubtedly be applied more and more frequently to the various problems with which it is concerned. *M. H. Post.*

Mawas, M. J. **Cystic capillary angiomatosis of the retina.** Ann. d'Ocul., 1931, v. 168, Nov., pp. 890-905.

The name cystic capillary angiomatosis is proposed for Hippel's disease because it includes the essentials but does not prejudge as to etiology. The condition is discussed comprehensively as a local and as a general (Lindau's) disease, appearing most commonly in the retina and brain. It has familial and hereditary tendencies.

From personal study of five cases the following stages are suggested: (1) change of tint of the fundus, orange pale with beginning papillitis; (2) stage one complicated by streaks resembling retinitis proliferans, a neuroglial reaction; (3) the most representative stage, having angiomatous tumors; (4) late stage with general invasion of the retina.

Photomicrographs, colored plates. (Bibliography.)

H. Rommel Hildreth.

Pavia, J. L. **Topographic photographs of the retina for localization of tears behind the equator.** Klin. M. f. Augenh., 1931, v. 87, Nov., p. 657. (Ill.) (See Amer. Jour. of Ophth., 1931, Dec., p. 1296.)

M. Davidson.

Puscariu, E., and Nitzulescu, J. **Three cases of retinitis pseudonephritica stellata. Considerations on the pathogenesis of neuroretinitis in general.** Brit. Jour. Ophth., 1931, v. 15, Dec., p. 697.

This contribution concerns itself with possible explanations of the pathogenesis of neuroretinitis observed in retinitis pseudoalbuminurica stellata and typical Bright's. The author is inclined to admit that the production of the neuroretinitis is independent of arterial hypertension. Three cases of retinitis pseudonephritica stellata are discussed in detail. The literature on the subject is presented together with a tabulation of all cases recorded. (Bibliography of sixty references.)

D. F. Harbridge.

Rubbrecht and De Jaeger. **Action of irritating substances on the choroid and retina.** Bull. Soc. Belge d'Ophth., 1931, no. 62, p. 51.

The authors have begun a series of experiments on the eyes of hares in order to discover the best means of producing inflammatory reactions capable of causing attachment of the choroid and retina to each other. The results furnished by the experiments are to be applied to the treatment of retinal detachment. The report, which is brief

and introductory, is illustrated by nine small pictures of the ophthalmoscopic appearance of the retinal lesions produced by the irritants. Chromic acid and jequiritol, nos. 2, 3, and 4, were the irritants employed. The authors conclude: (1) that the chorioretinal reaction as demonstrated by pigmentary migration begins to appear the fourth day after the application of jequiritol no. 2; (2) that the irritant spreads beyond the choroid and retina into the vitreous, where it produces grave lesions, fibrinous tracts sometimes forming in a few weeks with the typical appearance of retinitis proliferans; (3) that the ideal reaction is produced by application of the irritant to the choroid alone, by which method one obtains a minimum destructive lesion without retraction or formation of new tissue, and at the same time an inflammatory reaction of maximum effectiveness.

J. B. Thomas.

Rubbrecht, R. A new direction in the treatment of retinal detachment. Bull. Soc. Belge d'Opht., 1931, no. 62, p. 37.

The cure of detachment of the retina is obtained by causing an inflammatory reaction which will make the retina adhere to the choroid, and research is indicated to determine whether this reactionary lesion may not be better effected by means other than those heretofore employed. Among the pathogenic agents used by the author, abrine seemed to present great advantages. It acts like an antigen, thus resembling microbic agents which are the most common factors of inflammation. In a case reported by the author (myopia of 6 D., patient seen eight days after onset of sudden blindness) the sclera was incised in three spots in the region of the detachment and the small wounds touched with jequiritol 2 (Merck). The patient remained in bed a week, the retina was perfectly reapplied and the vision restored to the previous degree of acuity. This result had been maintained six months at the time the patient was presented to the society. In discussion Wibo reported a case successfully treated, several months after

detachment, by scleral puncture, withdrawal of the subretinal fluid, and instillation of a drop of a solution of the sclero-serum of Robert, commonly used in the treatment of varices. Van Lint said that the communication confirmed his previously stated belief that the mode of action of thermopuncture was the creation of an adhesion of the retina to the sclera and not the closure of the retinal tear.

J. B. Thomas.

Simson, Jutta. Calcium deposits in the choroid plexus in retinitis pigmentosa. Zeit. f. Augenh., 1931, v. 75, Sept., p. 164.

In a patient with bilateral calcareous deposits in the choroid plexus and with retinitis pigmentosa, no fundamental disease responsible for both findings could be discovered.

F. Herbert Haessler.

Stilo, A. Contribution to the microphysical structures of the rods of the retina. Ann. di Ottal., 1931, v. 59, July, p. 630.

Studies which have been verified by other research workers have demonstrated that the rods contain three lipoids: one soluble in acetone, one soluble in petroleum ether but not soluble in acetone, and a third not soluble in either of the former substances but soluble in benzole. Morphologically considered the rods consist of an external and an internal membrane. After extraction of its contents the rod appears as a hollow cylinder; and from this the conclusion is reached that it contained a lipoid with an envelope which is resistant to the common solvent. The internal membrane is a filament which recent research shows to be made up of superimposed discs supported by a substance resistant to the solvents but absorbing lipoids. By means of special apparatus and new technique the author has been able to expose individual rods on the dark field. The external rod membrane is refrangent and homogeneous. The hypothesis is advanced that the luminous periphery of the rod is in relation with the discoid lipoids within, and that there are in the

rods two colloids, one a gel constituting the discs, the other a sol between the discs. In the microscopical preparation, the intercalary body alone becomes after a time a fine gray powder. Doubtless the apparent cavity formed is an artifact due to the mixing and secondarily to contracture of the two colloidal substances. (Bibliography.)

Park Lewis.

Urrets Zavalía, A., and Brandán, R. A. **Ophthalmoscopically observed changes of arteriovenous retinal crossings as sign of angiosclerosis.** Arch. de Oft. Hisp.-Amer., 1931, v. 31, Nov., p. 617.

Six types of crossing are illustrated: (1) normal, with vein visible through retina and showing no changes in caliber or color or course; (2) diminished transparency of arterial wall, only; (3) blurring of vein adjacent to crossing, dullness of its color, its tapering toward artery, and loss of its central reflex; (4) veins disappearing on both sides of artery; (5) double sheathing of artery at crossing; (6) the artery becomes a white band at crossing. The changes noted are not due to compression, as thought by Agatston and others which would produce (a) flattening rather than apparent narrowing of the vein, or (b) venous stasis on one side; but to the forcing back of the vein by the rigid and thickened artery. In so far as indications of compression have been observed, it is probably the result of local changes in the vein. True compression with thrombosis may however occur in the case of the central vein, because at times it is enclosed together with the artery in an inelastic sheath. The changes are best seen in the larger vessels by direct ophthalmoscopy. Occasionally veins are seen to cross the arteries and show similar changes, but this is of less diagnostic importance. Rarely no crossings can be encountered in the fundus, by which to observe such changes. Of diagnostic and prognostic importance is the finding of the retinal changes in cases of contracted kidney and their absence in acute and subacute glomerulonephritis. *M. Davidson.*

Vazquez Barrière, A. **Lindau's, Hippel's and Coats' diseases.** Arch. de Oft., Hisp.-Amer., 1931, v. 31, Aug., p. 425.

While the three diseases are definite entities when clear-cut, there is a marked pathogenic kinship between them. They have in common alteration of the retinal vascular system, a tendency to exudation, and an angiomas of the central nervous system. Four cases are reported by the writer: (1) unilateral external exudative retinitis of the benign Leber type; (2) bilateral external exudative retinitis of the malignant Leber type, accompanied by intracranial hypertension; (3) intraocular pseudotumor with secondary glaucoma showing exudative retinitis after enucleation; (4) pseudoglioma with secondary glaucoma showing angiomatosis after enucleation. *M. Davidson.*

Werkle, Fritz. **Progressive atrophy of the choroid with pigmentary degeneration of the retina.** Klin. M. f. Augenh., 1931, v. 87, Aug., p. 173. (Ill.)

Out of thirty-three members of three generations of a family thirteen suffered from hemeralopia. Six of these could be examined at the clinic. They all showed changes of the fundus distinctly deviating from the picture of typical pigmentary degeneration of the retina. None presented essential alterations of the optic disc and the retinal vessels. The most severe changes were found in two otherwise healthy brothers, aged ten and twenty years (illustrated on a colored plate), demonstrating different stages of the same disease, characterized by progressive atrophy of the choroid with preservation of the macular region. A third patient, a man aged fifty years, not related to the former, showed a similar affection with perfectly white fundus. They are considered as the terminal stage of "atrophia gyrata chorioideæ et retinae", first described by E. Fuchs. Anatomopathological examinations are still lacking. The annular defects of the visual fields correspond to the atrophic foci and, with the ophthalmoscopic changes, speak for a primary seat of the affection in the choroid. There is a probable inferiority

of the germ cells for the choroid, especially as to the choriocapillaris. Myopia was frequently observed, but progressive myopia cannot be held responsible for the changes of the fundus. Beside the cases here described the literature contains about sixteen.

C. Zimmermann.

Weve, H., **A substitution method for localization of retinal tears.** *Klin. M. f. Augenh.*, 1931, v. 87, Aug., p. 145. (Ill.)

By means of an electric ophthalmoscope movable on a perimeter the diseased spot of the fundus is ascertained and then the eye of the patient is represented by a correspondingly placed phantom eye filled with water, on whose frosted glass wall the light of the electric ophthalmoscope is projected. This corresponds to the observed part of the fundus (retinal tear and so on) of the patient. By direct measurements it can be transferred to the eyeball. The directions are given in detail.

C. Zimmermann.

Wibaut, F. **Studies on retinitis pigmentosa.** *Klin. M. f. Augenh.*, 1931, v. 87, Sept., p. 298.

Wibaut made the attempt, still incomplete as he says, to distinguish clinically the hereditarily different forms of retinitis pigmentosa. He gathered his material chiefly from "The treasury of human inheritance" by K. Pearsons and Julia Bell. The great mass of the cases remains undistinguished, but the remainder is divided into two groups, namely dominant and recessive types. One may suppose that by far most cases of direct inheritance are of dominant form. Comparing both groups the recessive genealogical trees are characterized by prevalence of males (57.5 percent) over females (42.5 percent), deafness or often deafmutism (22 percent), and diseases of the central nervous system (6 percent). The dominant form shows nothing of all this. Hence the author concludes that the dominant type of retinitis pigmentosa is an independent disease, which by its feature of inheritance and in its whole character must be distinguished from the recessive form. The ophthal-

moscopic picture is identical in both. The investigations support the conception of a complex of different diseases in retinitis pigmentosa.

C. Zimmermann.

Yudkin, A. M. **The presence of vitamin A in the retina.** *Arch. of Ophth.*, 1931, v. 6, Oct., pp. 510-517.

In order to determine whether vitamin A is present in the retina, experiments were conducted in the feeding of white rats. The experimental animals were allowed to develop normally on a diet of calf meal, recommended by Maynard, along with 0.5 gm. of liver daily. One group of animals received three percent of codliver oil with the stock diet. The basal diet devoid of vitamin A was started only after the animals reached twenty-one to twenty-five days of age. After about twenty-one more days disturbances were noted, weight declined, and ocular lesions began to appear. At this point the feeding of retinal material was undertaken each day, to determine whether or not it contained vitamin A as indicated by relief of the ocular symptoms and the resumption of growth. Xerophthalmia and keratomalacia were regularly observed and hemeralopia was also recognized, both conditions analogous to those in human beings deprived of vitamin A.

All of these symptoms were relieved and the weight of the animals increased in a practically normal manner upon the introduction of retinal tissue into the vitamin-A-free diet. The same was not true in rats supplied with choroidal tissue.

Choroidal tissue is either entirely or almost entirely devoid of vitamin A, indicating that the vitamin A of the retinal tissue is not derived from extraneous tissue or contaminating blood.

M. H. Post.

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Berliner, M. L. **Medullated nerve fibers associated with choroiditis.** *Arch. of Ophth.*, 1931, v. 6, Sept., pp. 404-413.

The author reports a very extensive case of medullation of the nerve fibers,

associated in the right eye with central choroiditis, the first time that such a combination has ever been reported. This case confirms previous observations that the scotomata resulting from such myelinization are smaller in extent than the area of the retina involved. The occurrence of myelin sheaths in the retina appears to be concurrent with the presence there of oligodendroglia cells, which are regularly present in the optic nerve, but rarely found in the retina. This coincidence, taken with the investigations of Hortega, indicates that secretion from these cells is responsible for the presence of the medullary sheaths fibers in the retina.

M. H. Post.

Gibson, J. L. **Ocular plumbism in children.** *Brit. Jour. Ophth.*, 1931, v. 15, Nov., p. 637.

This contribution is for the purpose of again calling attention to the danger of using lead paint for outside surfaces within the reach of children. The cases here described, observed in Queensland, have no parallel among cases of industrial lead poisoning. The children affected ranged from two to eight years. The lead was ingested from soiled hands which had come in contact with painted veranda surfaces, the paint having become powdery due to tropical sun. Industrial poisoning is due to inhalation of lead dust.

More girls were affected and the occurrence was more frequent in the summer. The sudden development of squint is an early symptom, later followed by partial atrophy secondary to papilledema. Foot and wrist drop were frequent.

D. F. Harbridge.

Jones, C. P. **Visual fields in toxic blindness due to foci in the mouth and nose.** *Virginia Med. Jour.*, 1931, v. 58, Sept., p. 361.

Fifteen cases of acute blindness are reported in which careful field studies were made. By diagnosis of toxic blindness, the author means either partial or complete loss of vision, in which there is a contraction of the visual field with no demonstrable retinal pathology. All

of these cases were gone over very thoroughly and nothing found except foci in the nose and throat, eleven being due to infection of the sinuses, and four to infected teeth. The sinuses were treated by operation and the teeth extracted. All showed marked improvement, both in vision and in fields.

M. E. Marcove.

Leoz Ortin, G. **The practice and biology of plastic operations.** *Arch. de Oft. Hisp.-Amer.*, 1931, v. 31, Nov., p. 593. (See Section 6, Cornea and sclera.)

Martel, T. de, Monbrun, and Guillaume, J. **Acute papillary stasis.** *Arch. d'Ophth.*, v. 48, 1931, Oct., p. 678.

Nine cases reported in detail had lesions localized in the region of the posterior fossa and developed very severe and sudden papilledema. The writers call this papilledema acute stasis of the papilla and consider its rapid onset to be due to acute dilatation of the lateral and third ventricles, which is a part of the acute syndrome of the posterior fossa. This very marked papilledema may develop within forty-eight hours, while visual acuity may be very little disturbed. Cerebellar fits usually occur, making the prognosis grave in that the bulb is strangulated into the occipital foramen. When acute stasis of the papilla is observed, immediate action is necessary in the form of a two stage operation, the first part of which should be a removal of the posterior arch of the atlas, and the posterior border of the occipital foramen, and opening of the dura mater. This relieves the pressure on the medulla. Twenty-four hours later one may proceed with the operation for removal of the tumor. One patient in a state of crisis has been successfully operated on in this manner.

M. F. Weymann.

Reis, W., and Rothfeld, J. **Tuberculous of the optic nerve as complication of sarcoid of the skin of Darier-Roussy type.** *Graefe's Arch.*, 1931, v. 126, p. 357.

A girl of fifteen years had a sarcoid of the skin of the Darier-Roussy type,

involving first both cheeks and later appearing upon the extremities. At the same time there occurred headaches which increased in intensity and were accompanied by vomiting. When, at seventeen years of age, the patient was first examined by the authors, there was present in each cheek, involving the skin and subcutaneous tissue, a bluish-colored infiltration which was not sharply circumscribed. The infiltration in the right cheek was overlain by larger and smaller nodules, while the middle part of the infiltration in the left cheek was denuded of epithelium and covered by a seropurulent secretion. Similar large and small infiltrations were frequent on the extremities, particularly on the extensor side of the upper arms. Histologic examination of an excised piece of infiltrated skin from the back showed that the changes were located deeply subcutaneously. The infiltration was in the form of tubercles, composed almost exclusively of epithelioid cells with lymphocytes here and there. No giant cells were present nor any necrosis. Tubercle bacilli were not found in the sections and inoculations from pieces of the skin into guinea pigs were negative.

The eyes showed a bilateral exophthalmos, more pronounced on the left side. Vision in the right eye was ability to count fingers at 40 cm.; vision in left eye was zero. The right fundus revealed an optic atrophy secondary to choked disc, the swelling measuring 5 D. In the left eye the entire retina was changed into a white tumor whose superficial surface was uneven and was covered with retinal vessels; this mass extended forward at the center for about 20 D.

The patient gradually developed weakness of memory and deficiency of intelligence. Several months before death epileptic attacks occurred. After eighteen months duration of the disease, the patient died in an epileptic attack.

At autopsy there was found at the base of the brain a flat, somewhat glistening, yellowish, dense infiltration which occupied a large area of the base

of the brain, including the entire region of the infundibulum and chiasm as well as both optic nerves. The diameter of the left optic nerve after hardening and imbedding in celloidin was 7 mm. Histologic study showed that, as a complication of sarcoid, extension of a tuberculoid process from the brain involved the optic nerve, forming a tumor-like swelling in a choked disc.

H. D. Lamb.

Samuels, B. **Epipapillary tissues.** *Arch. of Ophth.*, 1931, v. 6, Nov., pp. 704-723.

The observations here reported were made on 300 adult eyes. In seventy instances the tissues were thought to have been present at birth. The subject is considered from the standpoint of congenital tissues; acquired tissues; histology, first of congenital tissues, second of acquired tissues; and then correlation of the histologic observations with the ophthalmoscopic pictures.

It is noted that congenital strands at the nerve head arise from the nasal side, rarely from the bottom of the cup. From the neuroglia arise all delicate, transparent veils on the nasal side of the cup, as do also the walls of cystic spaces in front of the nerve. The mass of cells at the bottom of the cup may contain both connective tissue and neuroglia, and should be called the central meniscus. The only abnormal connective tissue of congenital origin is represented by the pure white area often present in the center of the nerve head, and any connective tissue membranes arising from this mass. Glial membranes, if present, always lie over the nasal half of the optic cup.

M. H. Post.

Sanna, G. **Clinical contribution to the symptomatology of retrobulbar optic neuritis of rhinologic origin.** *Ann. di Ottol.*, 1931, v. 59, Aug., p. 730.

In a series of ten cases careful analysis of the findings in the fundus disclosed: one with perfectly white disc, normal vessels, and typical picture of descending white atrophy; four with

clouded papillary margins, peripapillary edema; five with pallor of the temporal side of the disc; two with macular chorioretinitis; two with an absence of fundus changes. Of the ten examined, the affection was unilateral in nine, and bilateral in only one. In every instance the eye involvement coincided with the side on which the sinus was affected. Concerning the vision, in one a small central scotoma was present, in some there was a large scotoma decentered to the temporal side, and in others there was narrowing of the visual field, amounting in one case to hemianopsia for colors. Vision ranged from 1/30 to 8/10. In one case only was there enlargement of the blind spot, coincident with central chorioretinitis. In each case it was the radiograms (which should be taken from different angles) that made the diagnosis positive. In no one of them were there any noticeable symptoms aside from those affecting the eyes. These also require special skill and experience in their interpretation. The polymorphic ocular symptomatology resulting from sinus involvement awaits a definite solution before we can arrive at its true evaluation, independent of the radiographic interpretation. (Bibliography.) *Park Lewis.*

Wolff, E., and Davis, F. **A contribution to the pathology of papilledema.** *Brit. Jour. Ophth.*, 1931, v. 15, Nov., p. 609.

In papilledema the swelling does not affect the whole disc at once, but starts in one or other part of it. It is pretty generally accepted that the temporal part is first affected. No satisfactory explanation has been advanced for this. Two principal theories of the mode of production of papilledema have been suggested; one that the increased intracranial pressure is transmitted to the subarachnoid space around the optic nerve, another that the subarachnoid space around the optic nerve communicates directly with lymphatic spaces around the central retinal vessels so that any increase in intracranial pressure would result in the cerebrospinal

fluid being forced into the optic nerve along the central retinal vessels.

The authors of this contribution did certain experiments on living animals, and observed facts which are summarized as follows: (1) Nondiffusible dyes injected into the subarachnoid space at pressures compatible with life do not enter the optic nerve. (2) The claims of previous investigators to have produced papilledema by the injection of fluids into the cranial subarachnoid space at pressures compatible with life are upheld by the present study. (3) Anatomical observations were made on the normal structure of the optic nerve head in the dog and in man. (4) Structural reasons are advanced for the special site of commencement of papilledema in man and for the extent of distribution of the edematous fluid associated with papilledema. (Nineteen illustrations and thirty-six references.)

D. F. Harbridge.

12. VISUAL TRACTS AND CENTERS

Abbott, W. D. **Ocular symptoms in the diagnosis of tumor of the brain.** *Arch. of Ophth.*, 1931, v. 6, Aug., pp. 244-253.

In this rather brief paper, the author has described in a most clear-cut and concise manner the localizing ocular lesions resulting from tumor formation involving the optic tracts. By a series of schematic drawings, the anatomy of the optic tract and the pupillary reflex are first described, after which the various interruptions to these tracts by tumor formation are shown by superimposing such blocks upon the anatomical drawing. The author warns, however, that the matter is rarely so well defined or clear-cut, one lesion frequently merging into the other. *M. H. Post.*

Baurmann, Max. **Anatomic findings in a case of binasal hemianopsia.** *Graefe's Arch.*, 1931, v. 126, p. 203.

A woman thirty-four years old, after suffering for one year with headache and for eight days with vomiting and diminished vision, showed a bilateral choked disc of about 7.0D. elevation with vision of 0.2 in the right eye, and

of 0.1 in the left eye. The right visual field presented absence of the nasal half with a small overstepping of the vertical midline and a small concentric contraction of the temporal half; the left visual field revealed total absence of the nasal half including the macular region, with only a little concentric contraction of the temporal half. Lumbar puncture produced considerable improvement in the papillæ and in the vision of both eyes. Three months later a palliative trephine operation was done, followed by return of the intracranial pressure with severe epileptic attacks. Two weeks after the trepanation, death occurred.

Section of the brain revealed a glioma developing from the corpus callosum; it lay for the most part on the left side and had invaded the left temporal lobe, the splenium, and the adjacent parts of the brain. Anteriorly the tumor had broken into the third ventricle and into the left lateral ventricle. There was noted a displacement downward of the anterior part of the chiasm and the optic nerve, and a crimping of the optic tract just behind the chiasm. Detailed findings were given after serial sectioning and staining of the myelin sheaths of each optic nerve and of the chiasm.

H. D. Lamb.

Davis, Loyal. **Chiasmal symptoms in intracranial tumors.** *Arch. of Ophth.*, 1931, v. 6, Aug., pp. 181-212.

The author reports selected cases from a series of 250 intracranial tumors, of which 191 were verified by microscopic section. The cases were chosen to illustrate certain points in an attempt to emphasize the definite dissimilarities of their various lesions. He has classified these symptoms under five different headings: (1) homolateral optic atrophy with contralateral papilledema and anosmia; (2) bilateral hemianopia and optic atrophy in middle-aged persons, with a normal sella turcica; (3) unilateral exophthalmos and optic atrophy; (4) indefinite defects in the fields, with optic atrophy and rapidly progressive loss of visual acuity; (5) indefinite defects in the

fields, papilledema and rapid progressive loss of visual acuity. Eight cases in all are reported in detail. In the entire series there were only fourteen cases of chiasmal lesion. All of these patients were operated upon, two died shortly after operation, and nine of those now living are socially and economically independent. The paper is a plea for the earlier recognition of these various pathological changes by roentgenologist and ophthalmologist.

M. H. Post.

Dyke, C. G., and Gross, S. W. **The roentgenotherapy of pituitary tumors.** *Bull. Neurological Institute of New York*, 1931, v. 1, no. 2, pp. 211-228.

In 1907 deep x-ray therapy was used in the treatment of pituitary neoplasms by A. Gramegna of Turin, and since that time many other successful cases have been reported. The authors state that Dr. Charles A. Elsberg is of the opinion that every patient with visual field defects due to a pituitary neoplasm should first receive a course of deep x-ray therapy, during which the visual acuity and the disturbances in the visual fields should be carefully observed. If improvement occurs, roentgenotherapy should be continued; if the visual fields and the visual acuity recede, surgical interference is indicated. Five cases of pituitary neoplasm successfully treated by deep x-ray therapy are reported. The technique of treatment is carefully outlined.

William M. James.

Hartgraves, H., and Kronfeld, P. C. **Gunshot Wound of the Optic Nerve.** *Arch. of Ophth.*, 1931, v. 6, Oct., pp. 554-557.

The bullet entered the right side of the skull just below the junction of the greater wing of the sphenoid with the temporal bone. The tip of the right anterior clinoid process was broken off. The deflected bullet came to lie one-fourth inch anterior to the left anterior clinoid process and one-eighth inch below it. The right optic nerve was permanently damaged; the oculomotor, the trochlear, and the ophthalmic division

of the trigeminal nerve, that is, all those structures that pass through the right optic canal and the superior orbital fissure, excepting the main vessels, were temporarily affected, but eventually recovered. Injury to these structures was the result of the breaking off of the tip of the anterior clinoid process, and an extradural hemorrhage was probably the immediate cause of damage. Eventually the patient presented a pure picture of amaurotic fixation of the right pupil. The anisocoria became more marked when the nasal half of the left retina was stimulated. This observation can only be explained by those theories that assume a suprachiasmal or second crossing of more than 50 percent of the fibers from one optic tract to the other.

M. H. Post.

Klauber, E. **Disturbances of the visual field in high blood pressure.** *Klin. M. f. Augenh.*, 1931, v. 87, Sept., p. 401. (Ill.)

In a woman of middle age periodic central scotomas, for the last twelve years, had occurred alternately in both eyes, lasting for several weeks. They were attributed to retrobulbar neuritis. Cleaning out of the ethmoidal cells brought slight improvement. Finally constitutional arterial hypertony without organic disease was found as the essential etiological factor. The fundus showed narrow arteries, with Gunn's crossing phenomenon. After the use of sodium nitrite transient venous retinal hemorrhages were observed. Under fruit diet and cure of constipation the scotoma attacks subsided.

An older woman, affected with nephrosclerosis and considerable secondary hypertension, presented winglike absolute scotomas starting from the blind spot, besides relative inferiority of the periphery of the retina. Gunn's crossing phenomenon and tortuous narrow retinal vessels were very marked. The scotomas were interpreted as due to damage of the retinal tissue by the hypertonic retinal vessels.

C. Zimmermann.

Moscardi, P. **Paresis of superior oblique muscle from indirect cranial trau-**

ma. *Riv. Oto-Neuro-Oft.*, 1931, v. 8, July-Aug., pp. 370-374.

As the result of an accident, a man twenty-seven years old had concussion of the brain whose symptoms lasted a few days, and diplopia on looking down which persisted at the time he was examined by the author several months after the accident. The diplopia was due to paresis of the left superior oblique muscle. The author, in discussing the case, mentions how trauma acting on different regions of the head causes paralysis of one or another of the ocular nerves. By analogy with other similar cases, and because of the anatomic relations of the pathetic nerve, the ocular symptoms of his patient were regarded as the result of a lesion of the left pathetic nerve at the level of the superior orbital fissure.

Melchior Lombardo.

Pretagnani, V. **Left homonymous hemianopsia from calcification of the internal carotid artery.** *Riv. Oto-Neuro-Oft.*, 1931, v. 8, July-Aug., pp. 317-323.

A man seventy-seven years old had a left homonymous hemianopsia with central scotoma for red, and defective vision of both eyes. He showed symptoms of high blood pressure and generalized arteriosclerosis. In the discussion of the case the author excludes tumors, tuberculosis, lues, and diseases of the hypophysis as causes of the hemianopsia. Taking into consideration the condition of the patient's vascular apparatus and the fact that lateral stereoscopic radiography of the skull showed at the right side of the sella turcica, some opacities of the calcareous type following a curvilinear course, the author concludes that the cause of the hemianopsia was compression of the chiasm by an aneurismal and calcified right internal carotid artery.

Melchior Lombardo.

Shannon, C. E. G. **Bitemporal paracentral scotoma.** *Arch. of Ophth.*, 1931, v. 6, Oct., pp. 544-547.

The case is reported because of the disposition of the scotoma unassoci-

ated with disease of the pituitary body, and the unusual etiology.

The scotomas were about circular in outline; that of the right eye measured approximately two degrees in diameter and that of the left eye three degrees. They were situated below the horizontal meridian, within the five degree limits. A few days after injections against typhoid, dysentery, and cholera, all used on the same day, vision was blurred and there was severe pain in the eyes. The veins of the fundus were dark, tortuous, and distended. There was some perivasculitis. The macula was dark and somewhat granular. Toward the temporal side and above the macula there were two small yellowish patches of exudate. The left eye was similar, but no exudate was observed. The Wassermann and Kahn reactions were negative. X-ray films of the skull showed nothing of special importance. Such scotomas may result from tumor of the pituitary body, syphilis, focal infection, or injection of serums.

M. H. Post.

13. EYEBALL AND ORBIT

Bach, E. C. **Spontaneous pulsating exophthalmos.** *Wisconsin Med. Jour.*, 1931, v. 30, Aug., p. 636.

After carefully reviewing the literature and giving the treatment, the author presents a case report of spontaneous pulsating exophthalmos occurring in a woman sixty-three years of age who had been suffering from dizzy spells and severe headaches on the right side for about one and a half years. Following a strenuous day she became very dizzy and had a slight headache. The next morning the right eye felt numb, with some bleeding from the inner canthus. Examination of the eye at this time showed marked proptosis, with pulsation synchronous with the radial pulse. There was a loud systolic bruit. The general physical examination was negative, except for a blood pressure of 200/115 mm. Digital pressure over the carotid artery stopped the pulsation and bruit. After ligation of the common carotid artery the pulsation was only barely perceptible and

nothing could be heard with the stethoscope. The headache still persisted. Because of sloughing of the conjunctiva and softness of the globe the eye was enucleated. Examination of the eyeball showed that the sclera was very friable and the eyeball filled with an old blood clot. All of the subjective symptoms have completely subsided.

M. E. Marcove.

Bietti, G. **Melanocarcinoma of the globe and orbit starting from the pigment epithelium.** *Klin. M. f. Augenh.*, 1931, v. 87, Oct., p. 459. (Ill.)

After an extensive review of literature the history and histological examination of a melanocarcinoma of the pigment epithelium of the left eye of a man of sixty-three years are reported. He died from metastases in liver and spinal cord. The tumor had developed simultaneously from the epithelium of the ciliary body and different parts of the pigment epithelium of the retina.

C. Zimmermann.

Charlin, C. C. **The nasal nerve syndrome.** *Arch. de Oft. Hisp.-Amer.*, 1931, v. 31, July, p. 369.

(See *American Journal of Ophthalmology*, 1931, v. 14, July, p. 705.) In the present paper fourteen illustrative cases are reported by the author.

M. Davidson.

Custodis, Ernst. **Inflammations of the orbit in supramaxillary osteomyelitis of infants.** *Klin. M. f. Augenh.*, 1931, v. 87, Nov., p. 631.

Five cases were observed, four of which were fatal. Supraorbital osteomyelitis occurs in the first four weeks after birth. After the first year it is less frequent. Generally it commences with swelling of the lower lid, especially its nasal portion, followed by abscess and formation of a fistula. By extension the eyeball is displaced and protruded from phlegmon of the orbit, with its deleterious sequels in the eye and the optic nerve. Especially at the beginning the disease may be mistaken for an affection of the lids and lacrimal sac. Three types are distinguished: (1) a severe

form with high fever and other general symptoms, fatal in a few days; (2) a less acute or more chronic type with metastasis, also of unfavorable prognosis; and (3) a lighter one with circumscribed abscess, which may become chronic and develop necrosis. The therapy consists in wide opening of the diseased focus. *C. Zimmermann.*

Dunnington, J. H. **Exophthalmos in infantile scurvy.** Arch. of Ophth., 1931, v. 6, Nov., pp. 731-739.

The author has been able to find only twenty-two detailed case reports of exophthalmos in scurvy, though textbooks state that exophthalmos occurs in about ten percent of all cases. The disease has been shown to be due to a defect in the cement substance of the endothelial cells of the blood vessels, the result of lack of vitamin C in the food. Hemorrhages occur as a consequence and are responsible for many of the symptoms of this disease, among them exophthalmos. The eye is pushed forward, downward, and outward, due, as a rule, to extravasation of blood between the orbital plate of the frontal bone and the subjacent periosteum. Absorption of these hemorrhages takes place in from four to thirty days after the initiation of antiscorbutic diet, but they are prone to recur when a scorbutic diet is again introduced. The amount of exophthalmos varies greatly. In some cases ulcer of the cornea follows. The hemorrhage then may be withdrawn by incision to advantage. Occasionally there is great swelling of the lids as well as protrusion of the globe. This exophthalmos is nonpulsatile, irreducible, and painful on pressure. In extreme cases motility is impaired. The average age is ten and a half months. The very rapid growth of the orbit about this time is probably largely responsible. One case is reported, in a child of seven months.

M. H. Post.

Hartleib, Robert. **Unilateral megalocornea or gigantophthalmos?** Klin. M. f. Augenh., 1931, v. 87, Nov., v. 654. (Ill.)

A woman aged twenty-one years presented without any pathological changes megalocornea of the left eye. As the base and radius of curvature of the cornea were enlarged, the iris broadened, and the left exophthalmos greater, with good function of the eye, it was hardly conceivable that the enlargement should have been limited to the anterior segment. Apparently the whole left eyeball was enlarged with normal proportions, so that this may have been a rare case of unilateral gigantophthalmos. *C. Zimmermann.*

Hartmann, K. **Bilateral orbital phlegmon as first sign of meningitis.** Klin. M. f. Augenh., 1931, v. 87, Sept., p. 404.

An acute meningitis in a previously healthy boy of nine years was complicated by a probably secondary bilateral orbital phlegmon. Upon early incision and energetic local and general therapy the affection healed after a severe illness of eight weeks, leaving moderate disturbance of intelligence and hydrocephalos, followed later by epileptic seizures. The author believes that the meningitis, caused by diplococcus lanceolatus, arose secondary to an unknown primary focus through either the blood or the lymph or by continuity, and led in a centrifugal direction to the bilateral orbital phlegmon.

C. Zimmermann.

Isakowitz, J. **Slow pulse in orbital phlegmon.** Klin. M. f. Augenh., 1931, v. 87, Oct., p. 522.

A man aged thirty years showed an enormous exophthalmos caused by phlegmon of the orbit after irrigation of the right frontal sinus. The eye was blind and immovable. The general condition was relatively little disturbed, temperature 37.8°, but the very irregular pulse had a frequency of from 48 to 60, apparently due to compression of and traction upon the eyeball. A broad incision through the upper lid along the orbital margin, followed by detachment of the periosteum, exposed behind the trochlea a rupture of the periorbita, from which about a tablespoonful of pus was evacuated. The next day the

frequency of the pulse was and remained normal. *C. Zimmermann.*

King, B. T. The cause of exophthalmos. *West. Jour. of Surg., Obstet., and Gyn.*, 1931, v. 39, Aug., p. 602. Also *Trans. Amer. Assoc. for the Study of Goiter*, 1931, p. 29.

This paper is based upon the study of 1500 cases operated upon for goiter. In about one-half of this number the diagnosis was exophthalmic goiter. More than fifty percent of the latter had varying degrees of exophthalmos. It is the author's belief that the exophthalmos of hyperthyroidism is due to orbital edema. In the presence of a greatly accelerated circulation, blood is pumped into the orbital cavity more rapidly than can be readily evacuated by the veins which leave the orbit through restricting and inelastic commissures and foramina, and the resultant edema is simply due to mechanical interference with return circulation. The apparent increase of intraorbital fat is due to the edematous swelling of fatty lobules. Failure of thyroidectomy to relieve long standing cases of exophthalmos is due to the deposition of new connective tissue in Tenon's capsule resulting from chronic congestion and edema of the orbit. One case of far advanced Graves' disease with enophthalmos of an old atrophic eye and pronounced exophthalmos of the normal eye is reported. The author's explanation is that the vessels of the functionless, atrophic eye never developed to a size at which the surging circulation which followed the onset of the goiter could produce congestion in the one orbit similar to that which took place in the other.

Five cases in the author's series and eleven cases from the literature are cited in which exophthalmos developed in patients after operation. In all of these cases, the basal metabolic rate was subnormal. The author is unable to explain the reason for this. He suggests ligation of the internal carotid for severe cases of exophthalmos. He also cites Naffziger's operation of orbital decompression in which a portion of the

outer orbital wall is excised. (Seven photographs and discussion.)

*M. E. Marcove.
George H. Stine.*

Michail, D. Tuberculoma of the orbit. *Ann. di Ottal.*, 1931, v. 59, Aug., p. 753.

Idiopathic tuberculosis of the orbit is exceedingly rare. In the majority of instances it originates from a tuberculous osteoperiostitis at the orbital margin, from the lacrimal sac, from tuberculosis of the lacrimal gland, or from the periorbital sinuses. It may originate from the choroid in the globe itself or from the optic nerve or its sheath. In each instance it is secondary to an infection in a neighboring part. A few cases have been described of tuberculous tumors of the orbit, which are of slow growth without any proximal invasion. These can be determined only by their pathology. The case described, which had been developing for four months, occurred in a woman of forty-seven years and caused protrusion of the left lower lid accompanied by pain, lacrimation, and left-sided hemicrania. Palpation indicated a small oval tumor, clearly circumscribed, with two prolongations, one extending backward toward the deeper tissues, the other toward the internal angle of the lids. With the exception of a slight clouding of the papilla, the eyes were normal. The lacrimal passages were both obstructed, causing chronic lacrimation. Positive Wassermann led to the exhibition of neosalvarsan, but without benefit. The tumor was then removed through an orbital opening made through the lower lid. This intervention disclosed a hard, lobulated, flat growth, readily separable from adjoining tissues. Histological examination showed a chronic inflammatory granuloma, containing giant cells typical of perineuritis and of interstitial orbital myositis. No bacilli nor necrotic areas were found. The diagnosis between pseudotumors of tuberculous and syphilitic origin can only be determined by clinical and histological observation. The author believes the infection to have been of hematogenous origin. (Bibliography, plates.) *Park Lewis.*

Plegge, Helene. **A new method for measuring the repressibility of the eyeball into the orbit (piezometry).** Klin. M. f. Augenh., 1931, v. 87, Nov., p. 584.

Plegge describes and illustrates a piezometer related to the piezometers of Langenhan and Mangold. Thirty-four measurements on twenty patients using a weight of 50 grammes are tabulated, showing an average repressibility of 4.41 mm. The difference between the two eyes of the same person was from 0.1 to 0.3 mm. Age and intraocular tension had no influence. The most important advantages of piezometry are deciding the question of the presence of a tumor or inflammation, following up the development of an orbital process, the differentiating between solid and vascular tumor, in Graves' disease, and in disturbances of the ocular muscles.

C. Zimmermann.

Plum, F. A. **Bilateral orbital abscess.** Northwest Med., 1931, v. 30, Aug., p. 371.

A Japanese boy aged twelve years developed on his upper lip a pimple which was opened surgically. Three days later he developed a similar pimple near the base of the nose, which was likewise opened. The next day the nose and both eyes became swollen. He was treated at home for seventeen days, and then transferred to the hospital. At this time all eyelids were enormously swollen, especially the upper lids. There was redness of the inner portions of both lids. The vision of the right eye was 20/30, the disc red but otherwise negative. The left pupil was widely dilated, there was complete ophthalmoplegia, no light perception, the disc white. There was extensive herniation of the lower conjunctiva between the eyelids. The temperature was 102 degrees. The orbits were opened through the frontal sinuses. No pus was obtained from the left side, but thick yellow pus from the right side. Drains were inserted. The next morning the swelling was gone from the right eye, but the left was unchanged. The septic temperature continued and the patient was slowly losing ground. A small abscess appeared at

the inner canthus of the left eye. This was drained and a large amount of pus obtained. The temperature rapidly fell to normal and the swelling disappeared. Three months later the vision in the right eye was 20/20, with the fundus and fields normal. There was no light perception in the left eye, and vertical movements were limited.

M. E. Marcove.

Poos, F., **Clinical observations on a case of habitual spontaneous luxation of the eyeball.** Klin. M. f. Augenh., 1931, v. 87, Sept., p. 307. (Ill.)

A robust woman aged forty-two years, with prominent eyes, related that ten years ago her right eyeball had prolapsed in front of the lids without special cause. During her first pregnancy this had occurred repeatedly. After a cessation of several years the eyeball had prolapsed again during sleep, eighteen months ago, with violent pain and impairment of sight. Measured with the exophthalmometer the right eye projected 27 mm., the left eye 26 mm. On lifting the upper lid with the finger, the eyeball prolapsed at once and the contraction of the lids behind it was painful. The same occurred with the left eye, which showed keratoconus. The cataract of the right eye was successfully extracted. As there was no deformity of the skull, nor a displacing process in the orbit, it was assumed that the protrusion of the normal-sized eyes with their inclination to luxation was caused by intense relaxation and yielding of the passively retaining apparatus of the eyeballs and weakness of the orbicularis.

C. Zimmermann.

Sondermann, R. **Contribution to the development of the vascular system in the human eye.** Graefe's Arch., 1931, v. 126, p. 341.

The iridoscleral veins, with blood from the pupillary membrane, and the lenticociliary veins, with blood from the vitreous and from the vascular tunic of the lens, are distinct from one another. The former proceed to the anterior ciliary veins, the latter unite to form

three or four primary ciliary veins which extend obliquely through the sclera and reach the outside in the region of the equator. The iridoscleral veins carry on the greater part of the development of the chamber angle; in the course of the third month they disappear up to the iridoscleral sinus, from which Schlemm's canal develops later. The pupillo-ciliary veins arise from the iridoscleral veins, and after the obliteration of the latter they conduct blood from the pupillary membrane to the uvea. The number of iridoscleral veins is apparently about sixty or seventy. The lenticociliary veins, in number about the same as the ciliary processes, extend over the margin of the optic cup to the uvea, where they become dilated under the obstructing influence of the thickened sclera and lead to the formation of the ciliary processes. After the obliteration of the primitive ciliary veins they flow into the vascular system of the uvea. Observations have demonstrated that not only does the entrance of the arteries (hyaloid and long posterior ciliary) into the eye occur while the tissue pressure is the weakest imaginable, but that the exit of the veins (iridoscleral, primitive, ciliary and later vorticosae) from the eye takes place while the tissue pressure is the highest conceivable. The latter condition must necessarily mean that the venous blood in its exit undergoes a blocking which causes dilatation and increase of pressure in the veins and capillaries. This would explain the author's finding in the vorticosae veins a pressure as high as 50 to 60 mm. Hg. A theory for the creation of intraocular pressure might thereby be sufficiently supported to serve as the basis for further research into pathologic ocular pressure.

H. D. Lamb.

Stewens, Hermann. **Exophthalmos persistent after thyroid extirpation.** *Zeit. f. Augenh.*, 1931, v. 75, Sept., p. 137.

The fact that exophthalmos rarely disappears after thyroid extirpation, and sometimes increases, suggests that all the manifestations of exophthalmic

goiter cannot have the same cause. In a number of cases recently reported, where there was a marked increase of exophthalmos with edema in the orbits, both eyes were lost. In the author's case only one eye was lost and the exophthalmos was unquestionably due to edema in the orbit. The edema certainly was not inflammatory and the consistency of the edematous tissue (lack of pitting) makes it unlikely that it resulted from venous hyperemia or toxic paralysis of the vessel walls. Myxedema seemed most likely. The administration of thyroxin, which is often of benefit, increased the exophthalmos, and produced tremendous chemosis, bilateral papilledema, and retinal hemorrhages, while general manifestations of hyperthyroidism appeared. The Abderhalden reaction as well as the presence of a small sella turcica suggested insufficiency of the hypophysis. Treatment with hypophysin was followed by disappearance of all symptoms.

F. Herbert Haessler.

Suker, G. F. **Squamous-cell carcinoma of the orbit. A probable metamorphosis of an adamantinoma.** *Jour. Amer. Med. Assoc.*, 1931, v. 97, Nov. 7, p. 1352.

In the case reported, a moderate right-sided partial facial paralysis was followed within one week by noninflammatory proptosis and rapid failure of vision of the right eye. Papilledema was present. Roentgenograms showed a suspicious shadow just back of the sphenoid fissure and optic canal.

Exploration followed by exenteration of the right orbit revealed a very firm, rather brittle, vascular tumor mass occupying the posterior third of the orbit. The tumor encircled the optic nerve, spread along the apex circumference on top of the periosteum, and filled the sphenoid fissure. Thorough cauterization of the apex and intensive roentgen therapy failed to prevent local recurrence in the orbit and general metastasis, which resulted in death of the patient five months later.

Suker found no similar case reported in the literature. He feels that the tumor developed from an anlage of amelo-

blast cell or cells that missed their correct route during the development of the denture, antrum, and orbit, and underwent early metamorphic changes, developing into a squamous-cell carcinoma. (Nine figures.)

George H. Stine.

14. EYELIDS AND LACRIMAL APPARATUS

Argañaraz. **Trephining the lacrimo-nasal canal.** Arch. de Oftal. de Buenos Aires, 1931, v. 6, June, p. 325.

The author injects a few drops of one percent methylene blue into the sac the day before operation, in order to more clearly distinguish its walls. Anesthesia is obtained with 5 percent novocain. The incision is in the form of a wide horizontal V, with the angle over the canthal ligament. Retraction is made by threads passed through the skin and held away by an assistant. The internal surface is dissected first. The Toti or West operation is indicated in mucocoele of the sac with no history of acute attacks, when the canal is free, and in the absence of intranasal inflammation. The author's operation is done with a trephine which carries just back of its point a gold cannula 2 mm. wide and 20 mm. long, pierced with drainage holes, and which is designed to fit into the hole made in the bone. The trephine is passed through the lacrimal bone, after the entire lower canal and external sac wall are slit with the Weber knife. The gold tube is thus carried into the wound created by the trephine point, and remains in place, where it favors the formation of a fistula draining directly into the nose. (Numerous illustrations.) *A. G. Wilde.*

Blegvad, Olaf. **Injuries to the eye from radium exposures.** Oftal. Selskab i København's Forhandlinger, 1930-1931, pp. 7-25. In Hospitalstidende, 1931, July 30. (See American Journal of Ophthalmology, 1931, v. 14, Nov., p. 1194.)

Bolotte and Fribourg-Blanc. **A case of tears of blood due to postcommotional disturbance of the vegetative**

nervous system. Arch. d'Ophth., v. 48, 1931, Oct., p. 697.

A soldier who was thrown from his horse and rendered unconscious showed a visual acuity of only 1/10 in the right eye four days later. No ophthalmoscopic findings were present to account for the lowered visual acuity. About three weeks later the injured man reported that fifteen days after his injury he had begun to have attacks of recurrent hemorrhage or tears of blood from his eyes about every two or three days. Examination revealed only a hyperemia of the inferior palpebral conjunctiva. The amount of blood which appeared was quite appreciable. Hospitalization caused gradual cessation of the attacks after three weeks. After leaving the hospital the hemorrhages recurred, and he was placed upon eserine therapy when a neurological examination revealed a sympatheticotonia. After five months of treatment no further hemorrhages occurred. The hemorrhages were of conjunctival origin and were probably due to conjunctival hyperemia caused by the sympatheticotonia. There was no hysteria. A brief review of the literature on the subject is given. *M. F. Weymann.*

Bömer, M. **A case in which both lacrimal sacs were lined with stratiform pavement epithelium.** Klin. M. f. Augenh., 1931, v. 87, Aug., p. 198, (Ill.)

Both lacrimal sacs of a man aged fifty years were extirpated on account of chronic dacryocystitis. The histological examination revealed a metaplasia of the cylindrical epithelium into stratiform pavement epithelium.

C. Zimmermann.

Coppez, L., and Meyers, A. **Radiography of the lacrimal passages before and after the dacryocystorhinostomy of Dupuy-Dutemps.** Bull. Soc. Belge d'Ophth., 1931, no. 62, p. 68.

Lipiodol is preferred for these radiograms, and they should be taken immediately after the injection, as elimination of the lipiodol is said to be complete after periods varying from ninety-five seconds to eight minutes. In many

cases radiography completes the clinical examination, and in those necessitating a plastic operation it gives indispensable information. Five clinical case reports and two full page illustrations are included in the paper.

J. B. Thomas.

Dercae, V., Chronic cystic trachomatous dacryocanalculitis. *Klin. M. f. Augenh.*, 1931, v. 87, Nov., p. 642. (Ill.)

Two cases are reported of ectasia and chronic blennorrhea of the upper canaliculus in patients, aged seventy-seven and fifty-five years, who suffered from chronic dacryocystitis and neglected trachoma. The author offers this explanation: By contraction of the fibers of the orbicularis embracing the upper canaliculus its vertical portion is compressed, its horizontal stretched. In blepharospasm no tears flow through the canaliculus, because its ascending portion is compressed and the horizontal stretched, so that the air of the lumen of the canaliculus is rarified, with subsequent aspiration of the contents of the lacrimal sac. The pathogenic germs alter the epithelium, and as the blepharospasm persists the mucous membrane swells, obstructing the entrance into the tear sac and leading to ectasia.

C. Zimmermann.

Halbertsma, K. T. A. Granulating mass in lids, with appearance of tuberculosis. *Rev. Oto-Neuro-Oftal.*, etc., 1931, v. 6, June, p. 227.

A series of cases of this affection, which the author regards as a clinical entity, is reported. It presents the following characteristics: unilateral nodules at the junction of the middle and internal thirds of the lids, their size varying from a grain of wheat to a hazelnut; consistence firm, overlying skin not adherent and showing no changes; nodules as prominent on the anterior as the posterior surface. The conjunctival surface is reddened and the veins enlarged; regional lymph glands not involved; no local inflammation of the globe; subacute course, appearing in the spring or autumn and in patients in good general health; age

incidence usually below thirty years; Wassermann negative, blood picture and urine normal.

Four cases are reported in which the process began in the upper lids, later appearing in a corresponding position below. On the nasal side the tumor mass merges with the surrounding tissue, its extirpation being more difficult there than on the temporal side, where there is a definite capsule. Chalazia, gummata, and actinomycosis are to be differentiated. While the picture is clinically that of tuberculosis, attempts to isolate and identify that organism have failed. Actual necrosis occurs only on the nasal side of the mass, i.e., where it is free of capsule, a symptom which the author regards as characteristic.

A. G. Wilde.

Hauer, Carl. Blepharospasm as early symptom in locomotor ataxia. *Klin. M. f. Augenh.*, 1931, v. 87, Sept., p. 361.

An electrician aged fifty-three years, who had acquired lues in his nineteenth year, exposed his eyes to the light of an arc lamp. This produced a violent inflammation, and blepharospasm for about two seconds. Gradually the latter became so frequent and intense that the eyes could not be opened voluntarily. Bilateral canthotomy brought only temporary relief, but five alcohol injections into the left and four into the right orbicularis stopped the spasm. Argyll Robertson pupils, anisocoria, and diminished reflexes indicated incipient tabes from lues of the central nervous system. A metaluetic process in the cells of the nucleus of the facial nerve, from which fibers for both orbicularis muscles arise, was assumed. This new eye symptom (blepharospasm) is analogous to neuralgic pains and tabetic crises. *C. Zimmermann.*

Hollander, L. Dermatitis of the upper eyelids due to use of a "hair tonic." *Jour. Amer. Med. Assoc.*, 1931, v. 97, Nov. 7, p. 1384.

Severe dermatitis of the upper eyelids was caused by the use of "Wild Root" hair tonic. The method of transmission was from the scalp to a bolster

cover used as a head rest, and from bolster cover to the closed upper eyelids. Discontinuance of the hair tonic and shampooing the head brought about recovery. ("Wild Root" contains arsenic and probably resorcin.)

George H. Stine.

Lutz, Anton. Concerning the nerve pathways for lacrimal secretion, and their disturbances. Graefe's Arch., 1931, v. 126, p. 304.

When annoying tearing is present, without ocular disease, foreign body, glaucoma or anomaly of refraction, one should look for reflex tearing due to changes in the other sensory tracts of the trigeminal nerve such as from beginning eruption of a wisdom tooth, severe caries, nasal polyps, swellings in the mucous membrane or nasal contacts. Orbital processes come under consideration only quite exceptionally. More important is the pterygopalatine fossa where, through irritation of the sphenopalatine ganglion caused by inflammatory processes in the nasopharyngeal space, in the maxillary antrum, and particularly in the sphenoidal sinus and the posterior ethmoidal cells, a definite symptom complex (Sluder) is produced, in which beside frequent acute colds there occurs an excessive flow of tears. The latter condition can be stopped by cocaineization of the nasal mucous membrane behind the middle turbinate. Destruction of the sphenopalatine ganglion, usually due to tumors of the posterior wall of the maxillary antrum, also causes abolition of tearing, double vision, sensory disturbances in the region of the second, and less frequently of the first trigeminal branch. The greater superficial petrosal nerve may be torn by fractures of the base of the skull; in fact it may be the only branch of the facial nerve affected. A herpes zoster infection of the geniculate ganglion may extend into this nerve, or tuberculous disease of the ear may destroy the facial nerve.

A few congenital cases of reflex and psychic tearing may be due to aplasia of the petrous portion of the temporal bone and underdevelopment of the fa-

cial nerve. Such cases are always unilateral and are recognized externally by maldevelopment of the auricle. Congenital reflex and psychic tearing may also be caused by aplasia of the nucleus of the facial nerve; these cases are usually bilateral. The author discusses a number of other causes for abnormality in lacrimal secretion. *H. D. Lamb.*

Marin Amat, M. A serious and late complication in dacryocystorhinostomy. Arch. de Oft. Hisp.-Amer., 1931, v. 31, Nov., p. 629. (See Amer. Jour. of Ophth., 1931, Dec., p. 1298.)

In addition to the ordinary complications during and immediately after operation, observed in a series of 250 cases, the writer has had two that brought him to regard the operation as more serious than it is customarily thought. Very serious late nasal hemorrhage occurred on the fifth day, in two women, one case lasting four days, and responding finally to tampons and hemostatics but culminating in a severe anemia; the other necessitating reopening an otherwise perfectly cicatrized operative wound which disclosed a bleeding artery in the lower nasal mucosa, the consequences including loss of the sac-mucosa fistula originally made, and a very severe secondary anemia. The fact that direct compression of the bleeding vessel was immediately successful in the second case, after fruitless tamponing, led the writer to review the operation practised on the case, and to attribute the complication to his having made a horizontal incision in the friable nasal mucosa in shaping a quadrilateral flap. This procedure cuts across the vertically running anterior ethmoidal arteries, whose bleeding may be temporarily controlled by the adrenalin, but breaks out again upon the patient's resumption of activity.

M. Davidson.

Müller, H. K. Congenital entropion by epiblepharon. Klin. M. f. Augenh., 1931, v. 87, Aug., p. 184. (Ill.)

A girl aged eighteen months showed epiblepharon of both lower lids, as also did her mother and sister. It consisted

of a fold of the skin close below the lid border, which in looking down became larger and pressed the lid border against the eyeball. The pressure and traction produced the entropion. A modified operation according to Hotz, after excision of a small part of the fold of the skin and fibers of the orbicularis, corrected the condition. The author observed epiblepharon in a brother and sister of another family and all three children of the brother. In both these families the anomaly was possibly due to dominant hereditary transmission.

C. Zimmermann.

Sanders-Larsen, S. **Obstruction of lacrimal canal treated by the silk-cord method.** *Oftal. Selskab i København's Forhandlinger*, 1930-1931, pp. 35-38. In *Hospitalstidende*, 1931, Oct. 29.

This is a modification of the method first brought out by Goebel of Trier in 1929. The author first slits one of the lacrimal ducts, either the upper or lower, and then introduces a blunt lacrimal trocar into the lacrimal canal through the obstruction. He withdraws the trocar point leaving the hollow sound in place. Through this is introduced a silk cord which has been stiffened for this purpose by being soaked in a solution of gum acacia and then dried under tension. When the lower end of the cord reaches the nose, it softens from the moisture, becomes flexible, and can be brought out at the nostril; a knot is made on the nasal end of the cord to hold it in place, and then the upper end is fastened to the skin with adhesive plaster. The cord is left sufficiently long so that it can be pulled up and down daily for cleansing and disinfection. After a few days the canal usually opens to such an extent that a solution can be washed through. The cord must be left in situ for from one to four weeks. The final results are very good. There are some remissions but, if this treatment is persisted in, radical operative measures are called for in only a very few instances. D. L. Tilderquist.

Towbin, B. G., and Adamyk, W. E. **The histologic changes in blepharo-**

chalasis. *Graefe's Arch.*, 1931, v. 126, p. 367.

The histologic changes in five cases of blepharochalasis are reported: three of the cases were in males, 16, 17 and 21 years old, and two in females 18 and 19 years old. In all the cases there was clinically an atrophy of the skin of the eyelids with glimmering through of the blood-vessels. Microscopically excised pieces of the lid-skin in every case showed collections of adventitial cells around the capillaries and the veins in the subepithelial layer. The vascular endothelium was thickened in places. The subepithelial connective tissue showed to a considerable degree a hyaline change, and was in places much loosened, particularly upon the summits of the hair-bulbs. Fewer elastic fibers were present than under normal conditions; these fibers stained unequally, and some showed club-shaped thickenings and were comparatively short. In several cases the covering epithelium revealed a diminution in its thickness. The palisade arrangement of the basal layer of the epithelium was absent. These basal epithelial cells stained unequally and weakly and their protoplasm contained brown pigment.

H. D. Lamb.

Warschawski, J. **The question of enucleation of the tarsus in trachomatous entropion.** *Klin. M. f. Augenh.*, 1931, v. 87, Sept., p. 378.

Warschawski and his collaborators now command a material of more than 1,600 enucleations of the tarsus and have the opportunity to see patients who have been operated upon 10, 15, 20 years ago and have remained free from relapses. This operation for removal of the deformity of the lids has strict indications. It yields permanent results without relapses only in the cicatricial stage of trachoma, after complete healing of cicatrized conjunctiva, and in pure entropion without trichiasis. The author thinks that the trichiasis can be removed only by a marginoplastic operation. The later stages of trachoma are no longer a disease of the conjunctiva but a tarsitis, and extirpation of

the tarsus is the operation of choice. In the early stages of trachoma expression of the granule is combined with thorough curetting of the whole conjunctiva with the sharp spoon.

C. Zimmermann.

15. TUMORS

Blatt, N. **Chloroma of the orbit.** Klin. M. f. Augenh., 1931, v. 87, Aug., p. 209. (Ill.)

The left eyeball of a girl aged three years was imbedded in a hard brown-greenish tumor of the size of a hen's egg, protruding from the palpebral fissure. The right eye was exophthalmic, immovable, and slightly dislocated upward and toward the temple. Above and below the eye hard nodular tumors were felt, and there were extensive tumors of the cranial bones. The child returned home and died after eight weeks. Examinations of the blood and of excised pieces are described in detail. In accord with Schmaus the author considers chloroma as sarcomatosis of the bones in individuals of inferior hematopoietic system of the embryonic "anlage."

C. Zimmermann.

Casanovas Carnicer, J. **A contribution to the study of the histology of orbital melanomas.** Arch. de Oft. Hisp.-Amer., 1931, v. 31, Oct., p. 548.

A case of orbital melanoma whose origin was traced to the scleral chromatophores is described and illustrated. The writer believes that if cases arising from conjunctiva, sclera, and optic nerve sheaths are eliminated, primary orbital melanoma must be very rare and difficult to prove.

M. Davidson.

Cunningham, O. D. **Fibrosarcoma of orbit: Krönlein operation.** Illinois Med. Jour., 1931, v. 60, Aug., p. 120.

A seventeen-year-old boy complained of intermittent swelling of the left upper lid which lasted for two or three days at a time. The eye had been gradually becoming more prominent. There was only an occasional sharp pain. The vision was failing. Examination of the eye was negative except for protrusion, with edema of the upper lid. No masses

could be felt. There was limitation of abduction in this eye. The fundi were normal. X-ray of the sinuses was negative, but the entire left orbit was somewhat opaque. A diagnosis of retrobulbar tumor was made and a Krönlein operation performed. An encapsulated tumor removed from the orbit was diagnosed by the pathologist as fibrosarcoma. The patient was given six deep x-ray treatments. Before operation the field of the left eye for form showed concentric contraction with marked contraction for colors and a five-degree central scotoma for blue. After operation the fields became entirely normal. Vision with correction has returned to normal, but a slight exophthalmos remains. (Discussion.)

M. E. Marcove.

Knapp, Paul, **Melanomas of the fundus.** Klin. M. f. Augenh., 1931, v. 87, Aug., p. 245. (Ill.)

Melanomas of the fundus are not so rare as hitherto believed. Microscopically they consist of accumulations of the chromatophores in the external strata of the choroid, which generally is thickened, the choriocapillaris usually remaining free. Whether they are congenital is not known. Apparently they were found in older persons. Six cases are reported, some of them perhaps results of isolated choroiditic foci. Slight tumor formation does not allow a certain diagnosis of sarcoma. This could be excluded in three of the cases, and three were doubtful. Sarcoma can only be assumed if there is a definite neoformation with tendency to growth.

C. Zimmermann.

Michail, D. **Orbital cholesteatoma.** Arch. d'Ophth., 1931, v. 48, Nov., p. 743.

Cholesteatoma is described as a cystic formation, consisting of a central layered mass without cellular structure, enclosed by a wall made up of an epidermal and dermal layer. One case of such a growth occurring in the orbit of a nine-year-old boy is described in detail. The tumor was located in the upper external portion of the orbit and had eroded the frontal bone so that only

an osseous bridge crossed the growth. Extirpation was done without accident, but fistulization occurred which required removal of the bony bridge to obtain complete healing. Histologic examination showed the tumor to be a typical cholesteatoma. Photographs, radiographs, and a microphotograph accompany this article.

M. F. Weymann.

Moore, R. F., Stallard, H. B., and Milner, J. G. **Retinal gliomata treated by radon seeds.** *Brit. Jour. Ophth.*, 1931, v. 15, Sept., p. 514.

Early glioma of the retina is seldom observed unless the condition has been discovered in the other eye. The use of radium is desirable in bilateral glioma when there is a functioning retinal area in at least one eye. In cases in which, after careful search, the second eye is found to be free, most surgeons would advise removal of the affected eye.

The radium seeds range in strength from 1 to 5.3 millicuries, filtration being through 0.5 mm. of platinum. The seeds are attached to a piece of black silk or have a collar for removal or for control of position.

It is desirable to so insert the seeds that they are completely embedded in the growth. This is determined by the use of the ophthalmoscope. The growth is located, and a 3 mm. incision is made through the exposed sclera. The location of this incision is marked by dipping the needle in a solution of gentian violet. The seed is introduced by a special forceps. After allowing the seed to remain ten days the conjunctival incision is reopened, the black silk found, and the seed extracted.

Five cases are reported in detail, of which it was possible to watch only two for any considerable period. It is shown that a retinal glioma will disappear under the influence of radon seeds. In a recorded case a glioma of moderate size was not only not increased in size twenty-two months after the commencement of treatment, but was shrunken and seemed to be completely scarred. It would, however, be premature to say that the tumor was perma-

nently cured. Histological changes in the glioma cells which have been exposed to the radon seeds have been demonstrated. Opacities of a special type in the lens have developed and have afterward disappeared completely.

Further investigations with radon seeds on sarcomata as well as gliomata are being prosecuted, both intraocularly and as surface applications to the sclerotic. (Twenty illustrations.)

D. F. Harbridge.

Schneider, R. **Vascular nevus of the conjunctiva and episclera.** *Zeit. f. Augenh.*, 1931, v. 75, Sept., p. 136.

Since birth the left eye of an eight-year-old girl was constantly red. This phenomenon was due to a network of dilated veins which surrounded the cornea in the form of a Landolt ring open below. The lesion is a typical vascular nevus, a pure venous dilatation without capillary proliferation, and must be considered a congenital malformation.

F. Herbert Haessler.

Sédan, J., Astier, A., and Caudière, M. **Radiotherapy of a lymphocytoma and a lymphoblastoma of the orbit.** *Ann. d'Ocul.*, 1931, v. 168, Oct., pp. 815-825.

The lymphocytoma was in a woman aged sixty-four years. Evidence of the tumor appeared in 1925, and development was slow for a year and a half, then rapid. In May, 1927, the tumor was removed surgically and was diagnosed as lymphocytoma, histologically benign. Some months later a recurrence appeared with rapid growth. The authors were then consulted for the first time. Report of a biopsy confirmed the earlier diagnosis and x-ray treatment was given. The tumor disappeared promptly, leaving a moderate enophthalmos. The vision remained normal throughout.

In the second patient, a woman of forty-four years, the disease began like a dacryocystitis with abscess formation. A tumor later developed and was removed surgically. The tumor recurred and was treated with x-ray, which caused rapid disappearance of

the mass. Metastases developed successively in the cervical, submental, malar, inguinal and mediastinal regions. Each of these tumors responded promptly to x-ray therapy. The patient died seven months after the onset of the disease.

H. Rommel Hildreth.

16. INJURIES

Goalwin, H. A. **Some contributions to the art of localizing ocular foreign bodies.** Arch. of Ophth., 1931, v. 6, Aug., pp. 221-243.

This paper deals with all aspects of this subject in considerable detail. Space can only be given to a notation of the different headings under which the subject is considered. These are: meridional localization and localization with respect to structures of the eye; an improved chart; the square root rule; calculating the size of a foreign body; borderline localizations; two-scale plotting; mathematical localization (nongraphic); localization in the highly ametropic eye; application of the Wessely keratometer; some modifications of the Vogt (bone-free) method; ophthalmoscopic localization; a simplified apparatus; a convenient drawing board; a convenient viewing box; the author concludes that no true localization can be made on the present charts, except when the foreign body happens to be in the plane of the horizontal or vertical meridian, and only by indicating the meridian in which the foreign body lies can such an exact localization be made. For this purpose a chart called the meridional localization chart has been designed by the author to be used in combination with the present orthographic one.

M. H. Post.

Goldstein, I., and Wexler, D. **Metastasis in the sheath of the optic nerve from carcinoma of the stomach.** Arch. of Ophth., 1931, v. 6, Sept., pp. 414-419.

As a rule, metastatic carcinoma of the eye affects the choroid. In only four instances reported has the nerve alone been involved. In the case now reported there was total absence of visual disturbance. The uvea and disc were nor-

mal. In the longitudinal section of the optic nerve, the new growth stood out as a dark-staining mass of tissue, involving chiefly the arachnoid and extending to the apex of the vaginal space. On cross section, the tumor did not appear so dense. The dura was not involved. The pia was somewhat invaded. Of especial significance was the presence of a clump of tumor cells within the lumen of an arteriole in the subdural space. The nerve itself was free from all disturbance.

M. H. Post.

Lampert and Lambert. **A case of unusual migration of a foreign body in the vitreous.** Arch. d'Ophth., v. 48, 1931, Oct., p. 708.

A particle of bronze, which was seen ophthalmoscopically in the lower anterior portion of the vitreous in February, 1929, was found in the iris angle of the anterior chamber following several days of severe pain and congestion in the eye in April, 1931. The particle was removed through a keratome incision, after which the eye became quiet and the pain disappeared. The foreign body was a small particle of bronze which may have moved from its position in the vitreous to the anterior chamber through the physiological movements of the eye, through osmotic currents in the media, or through the mechanism of inflammatory reactions.

M. F. Weymann.

Larkin, B. J. **Blood stain of the cornea.** Jour. Indiana State Med. Assoc., 1931, v. 24, July 15, p. 365.

Larkin reviews the literature, quoting from several authors, especially Fuchs. A case is reported of a boy who developed the condition from hemorrhages into the anterior chamber following a blow with a whip. (Bibliography.)

Ralph W. Danielson.

McNally, W. D. **Treatment of eye burns produced by tear gas (chloracetophenone).** Jour. Amer. Med. Assoc., 1932, v. 98, Jan. 2, p. 45.

All burns of the skin caused by chloracetophenone should be promptly

washed with a fifty percent alcoholic solution of sodium sulphite. In the absence of sodium sulphite, glycerin or alcohol should be used, as prompt removal of the chloracetophenone will prevent several days of distress. For the eyes, 0.4 percent sodium sulphite dissolved in 25 c.c. of water and 75 c.c. of glycerin should be used.

George H. Stine.

Thies, O. Late complications of cauterization of the eyes by alkalis. Arch. f. Augenh., 1931, v. 105, Oct., pp. 47-54.

Thies reports two cases of severe alkali burn of the conjunctiva and eyelids, in which there were late complications. In both patients there was a second degree burn of the conjunctiva that healed in a few weeks. Several weeks later there was recurrence of the inflammation with development of peculiar foci of necrosis in the conjunctiva, particularly in the fornix. These foci were interpreted as a late necrosis or eschar, of the type following caustic burns.

The author feels that these eschars are due to the impossibility of entirely removing the caustic from the deep folds and pockets of the conjunctiva. This results in a third degree burn which, because of its position, makes a delayed appearance. This late complication has not been previously reported.

Frederick C. Cordes.

17. SYSTEMIC DISEASES AND PARASITES

Adie, W. J. Pseudo-Argyll Robertson pupils with absent tendon reflexes. Brit. Med. Jour., 1931, May 30, v. 1, p. 928.

Adie wishes to draw attention to a benign symptomless disorder characterized by pupils which react to accommodation but not to light, and by absent tendon reflexes. The author says that the pure Argyll Robertson pupil reacts promptly and fully, often excessively, on convergence, and dilates again as soon as the effort to converge the visual axes is relaxed. In these cases the pupils show the so-called myotonic reaction; they do not respond to light; they contract very slowly through a

wide range during a sustained effort to converge; often remain small long after the effort ends; and, when they dilate again, do so slowly. It is mentioned that under the title "non-luetic Argyll Robertson pupil" Foster Moore has described fifteen cases in which the syndrome is the same as the cases here reported except that the knee jerks were retained. Adie also believes his cases are related to those reported by Morgan and Symonds in which there were unequal pupils, failure of accommodation, and diminished or lost tendon reflexes. (Six case reports and a bibliography.) *Ralph W. Danielson.*

Archangelsky, W. N., and Braunstein, N. E. The pathological anatomy of ophthalmomyiasis interna. Klin. M. f. Augenh., 1931, v. 87, Sept., p. 340. (Ill.)

A girl aged four years presented the aspect of a severe tuberculous affection of one eye which necessitated enucleation. The microscopical examination revealed iridocyclitis, shrunken, partly cataractous, lens, lymphoid infiltration of the choroid, perivascular infiltration of the detached retina, under which a roundish body lay in the sub-retinal fluid near the choroid. This was determined to be a diptera larva of the oestrus family. In the majority of cases ophthalmomyiasis is confined to the conjunctival sac without destruction of tissue. Sometimes, apparently exclusively in children below ten years, the larva penetrates the ocular wall and settles for some months in the anterior chamber, from which it can be removed with recovery of the inflammation of the anterior segment of the eyeball. In the present case of ophthalmomyiasis interna the larva seems to have penetrated the limbus into the anterior chamber, migrating through the pupil, remaining for a while between lens and iris, and later perforating the retina.

C. Zimmermann.

Ascher, K. W. The eye and diabetes. Klin. Woch., 1931, July 25, p. 1407.

This is an efficient general review of the subject, unsuitable for abstract.

Badot. **The persistent pains of ophthalmic zona.** Bull. Soc. Belge d'Ophth., 1931, no. 62, p. 9.

The writer reviews briefly the various forms of treatment of the pains that may follow the healing of zona. In four cases he practised stretching of the most important terminal trunks of the ophthalmic branch of the trigeminus, obtaining complete relief in three cases and partial relief in one. In the discussion of the paper Rasquin stated that after several years' experience he still used successfully his method of injecting eighty percent ethyl alcohol in these cases.

Coppez suggested that before undertaking the more radical methods of treatment one should try medical diathermy. Now and then the pain is due to the pinching of a peripheral branch of the nerve in the cicatricial tissue of zona, and diathermy brings relief by softening the cicatrix.

J. B. Thomas.

Bosse, Dorothea. **Osteomyelitis of the superior maxilla in infancy and its significance for the eye physician.** Graefe's Arch., 1931, v. 126, p. 465.

These children frequently come to the ophthalmologist with considerable swelling of the eyelids, or exophthalmos with chemosis of the bulbar conjunctiva. Differential diagnosis must therefore be made between osteomyelitis of the superior maxilla, phlegmon of the tear sac, and phlegmon of the orbit with thrombosis of the cavernous sinus. The latter conditions may actually exist as the result of an extension of the osteomyelitis. A quick opening of the purulent focus is always important. Intramuscular injections of blood from the parents afford good service in combating the general infection.

In the author's third case, an extension of the process into the orbit, causing an orbital abscess, produced choked disc, thrombosis of the central retinal vein, and many retinal hemorrhages.

H. D. Lamb.

Charlin, Carlos. **The nasal-nerve syndrome.** Ann. d'Ocul., 1931, v. 168, Oct., pp. 808-815.

A further report on this syndrome is given with three additional cases. The first case, one of iritis, demonstrated acute homolateral anterior nasal disease and hyperesthesia of the skin of nasal nerve distribution. The second case, beside the characteristic nasal findings on the same side, showed only ocular changes of the most minute degree. In the third case orbital and peri-orbital neuralgia dominated the picture. Immediate relief from pain came in all three cases with the use of cocaine and adrenalin to the anterior nasal mucosa. *H. Rommel Hildreth.*

François, Jules. **Neuritis of the nasal nerve.** Arch. d'Ophth., 1931, v. 48, Nov., p. 766.

A minute review of the distribution of the fifth nerve and its branches is given to assist in the interpretation of the findings in a patient who suffered crises of pain in the left eye and left nostril. These attacks occurred six to eight times daily and lasted five to fifteen minutes. There was a hyperesthesia of the left cornea and left nostril. The left cornea showed discrete erosions of the epithelium with small superficial parenchymal opacities. There was a deviation of the septum and marked swelling of the inferior turbinate. An abundant rhinorrhea was present. Under treatment by cocaineization of the left nostril the corneal lesions and all pain disappeared.

The diagnostic points in neuritis of the nasal nerve are: first, a lesion of the anterior segment of the eye on the affected side; second, paroxysms of violent neuralgic pain radiating from the orbit to the region of the nostril; third, abundant rhinorrhea; fourth, congestion of the anterior portion of the inferior turbinate with hyperesthesia; fifth, at times lesions of the skin around the nostril; sixth, immediate relief of the ocular pain by application of cocaine to the anterior portion of the nasal fossa and no relief from cocaine dropped into the eye; and seventh, rapid cure of the condition by continued use of cocaine and adrenalin in the nose.

The cause of this condition is prob-

ably strangulation of the nasal nerve by a swollen mucous membrane. It should be differentiated from neuralgia due to the ophthalmic ganglion, where cocaine instilled in the eye will relieve the pain; and the syndrome of the sphenopalatine ganglion, in which there is no lesion in the eye and no cutaneous hyperesthesia, and where the application of cocaine to the mucous membrane over this ganglion relieves the symptoms.

M. F. Weymann.

Juhász-Schäffer, A. The behavior of the eyes of rats in E avitaminosis. *Klin. M. f. Augenh.*, 1931, v. 87, Aug., p. 203.

Rats observed for nine months showed that E avitaminosis created in the testicles a hypobiotic process consisting of atrophy and necrosis of the germ epithelium, producing sterility in 100 per cent of the cases, whereas during the whole period no pathological changes of the eyes could be noticed. Hence lack of E vitamin is of no importance for the eyes of rats.

C. Zimmermann.

Macpherson, Duncan, Crigler, L. W., and Imperatori, C. J. Present status of sinusitis in eye disorders (a symposium). *The Laryngoscope*. 1931, v. 41, July, p. 451.

Rhinological aspect: Macpherson reports a number of cases of which some were treated by suction, some by "ventilation" of ethmoids and sphenoids, some by exenteration, some by antral treatment combined with suction and packs, some by tonsillectomy and ethmoidal exenteration, others by submucous resection, antrotomy, and ethmoidal exenteration.

Ophthalmological aspect: Crigler discusses many different situations, and thinks most ophthalmologists will agree that in the presence of progressive and rapidly failing vision due to retrobulbar neuritis, where all other foci of infection have been eliminated, the sinuses should be exenterated, irrespective of a normal appearance, although there is less unanimity of opinion concerning radical measures where the uveal tract alone is involved.

Summary: Imperatori gives a rather detailed outline of the literature and of the statistics reported by various authors. The relationship of retrobulbar neuritis to multiple sclerosis is discussed. Imperatori believes that sinus diseases cause iritis, cyclitis, retinitis, choroiditis, and optic neuritis. He says that the dangers from a sinus operation carefully done are not sufficient to justify temporizing when the integrity of the eye is in danger.

Ralph W. Danielson.

Mayer, L. L. Tuberculous lesions of the eye in active pulmonary tuberculosis. *Jour. Missouri State Med. Assoc.*, 1931, v. 28, July, p. 318.

Mayer gives a résumé of the literature on the subject. He reports that in examining all the cases at the Jewish Sanatorium at Saint Louis over a period of five years he found only one case of definite ocular tuberculosis (iritis). One case suspicious of fundus tuberculosis was finally dismissed as being a case of Gunn's dots.

Ralph W. Danielson.

Popović, J. M. Rheumatism and eye. *Klin. M. f. Augenh.*, 1931, v. 87, Sept., p. 365.

Gonorrheal affections of the joints secondary to primary gonorrheal conjunctivitis suggest, according to the author, the possibility of articular rheumatism secondary to rheumatic eye affections. These occur in the iris, the sclera, and Tenon's capsule, which two latter have the same histological structure as the tendons, fasciæ, ligaments and perimysium, in which generally the primary eruptions of rheumatism become manifest. Clinical observations corroborate this possibility, so that the author believes that iritis, scleritis, and tenonitis of rheumatic basis may be not only metastatic (secondary), as so far supposed, but also primary with or without later secondary phenomena elsewhere.

C. Zimmermann.

Puscariu, Elena. Statistical researches upon ocular syphilis. *Arch. d'Opht.*, 1931, v. 48, Nov., p. 756.

A review of the literature indicated that the incidence of ocular syphilis varied from 0.42 percent to 10 percent according to different observers. Many of these statistics are cited in detail. Upon hospitalized patients with complete examinations, the writer found 6.9 percent of all cases to be syphilitic. In order of their frequency of affection, the various parts of the eye may be listed as follows: cornea, optic nerve, iris and ciliary body, choroid and retina, muscles, lids, sclera, conjunctiva, and orbit. In 78.23 percent of individuals with ocular syphilis serodiagnostic tests were positive, while in only 64.46 percent could clinical signs of extraocular syphilis be discovered. One hundred and eleven out of three hundred and forty-six eyes affected with syphilis became blind, so that syphilis must be considered as an important factor in the cause of blindness.

M. F. Weymann.

Ruedemann, A. D. **The ductless glands as they appertain to eye diseases and to surgery.** Jour. Amer. Med. Assoc., 1931, v. 97, Dec. 5, pp. 1700.

Frequently it is found that patients who are examined for glasses have a muscle imbalance which may be due to hypothyroidism or other glandular dysfunction. Hyperthyroidism produces definite eye changes, which in most cases are benefited by surgery; namely, wide fissures, ulcers, and exophthalmos. Associated muscle changes, of which the commonest is weakness of accommodative convergence which persists postoperatively, are little benefited by any treatment, medical or surgical. In parathyroid tetany, lens changes are sometimes present, probably the result of a combination of spasm with deficiency of calcium and phosphorus. In these cases the eye surgeon should know the blood calcium before operation; otherwise he will have to contend with the most severe convulsive type of vomiting. This condition may be controlled by the administration of intravenous injections of ten c.c. of calcium chloride in five percent solution, some sodium chloride being used before and

after the administration of the calcium chloride to make sure it flows easily and is washed in afterward. Dysfunction of the pituitary gland is a causative factor in certain retinal disturbances, and is an associated factor in other eye changes (such as progressive myopia, keratoconus, and high corneal astigmatism) probably of polyglandular origin. The recent work of Crile also brings out a group of cases in which suprarenal dysfunction is associated with all the eye changes seen in hyperthyroidism, except exophthalmos. All these eye signs disappear after denervation of the suprarenals. (Discussion.)

George H. Stine.

Shepardson, H. C., and Crawford, J. W. **Ocular findings in diabetes.** California and West. Med., 1931, v. 35, Aug., p. 111.

This paper is based upon complete eye examinations of sixty-eight diabetic patients ranging in age from 18 to 79 years, the average being 54 years. The most frequent complication found was a retinitis of a somewhat characteristic pattern. This was found in twenty-three percent of the patients, all of this group having renal impairment and all but four generalized arteriosclerosis. Retinitis was not found in uncomplicated diabetes. It was most commonly seen in patients over fifty years old, with only a mild diabetes.

Lenticular opacities were diagnosed in fifty-four percent of the patients, but no special characteristics were noticed to differentiate them from the usual changes associated with senility.

Paralysis of accommodation was not present in this series. The average age of onset of presbyopic symptoms was forty-seven years. From this it is concluded that early presbyopia in diabetes is only a very occasional finding. Only one case of extraocular muscle palsy was found. Routine fields showed no characteristic perimetric changes. In nine cases (seventeen percent) there was glaucoma simplex.

The authors conclude that almost all diseases of the eye found in association with diabetes result from the systemic

complications of that disease. Two conditions which may prove exceptions to this statement are juvenile cataract and elevation of intraocular tension. (Discussion.)

M. E. Marcove.

Van Duyse, M. **Heredity in ocular diseases.** *Arch. d'Opht.*, v. 48, 1931, Oct., p. 657.

A brief discussion of the Mendelian theory of inheritance is given along with examples of dominant and recessive types of transmission. The general rule is that when a disease is transmitted as a dominant characteristic it is found in every generation and never occurs in the children of unaffected parents, while the recessive type may skip many generations and then appear in the children of unaffected parents.

Essential hesperanopia, senile cataract, congenital cataract, hereditary adult glaucoma, juvenile glaucoma, and blue sclerotics are considered as being hereditary factors of a dominant type. Complete albinism, pigmentary degeneration, amaurotic family idiocy, and hydrophthalmos are considered as factors transmitted in a recessive manner. Recessive characteristics are very likely to be brought out by consanguineous unions. Color blindness, Leber's disease, and certain types of nystagmus are inherited as sex-linked characteristics. The heredity of errors of refraction and strabismus is not yet well determined. A plea is made for more complete records of afflicted families in order that the transmission of hereditary defects may be worked out.

(Numerous genealogical trees.)

M. F. Weymann.

Weve, H. **Bilateral intraocular cysticercus. Spontaneous healing of the right eye; healing of the left eye after galvanocauterization.** *Klin. M. f. Augenh.*, 1931, v. 87, Nov., p. 597. (Ill.)

A mulatto girl aged seventeen years, who had come from Surinam to Utrecht, presented in each eye a cysticercus near the optic nerve. The ophthalmoscopic changes are described in detail and the diagnostic signs discussed. The enigmatic general condi-

tion seemed to indicate participation of the brain, but ended upon spontaneous healing of the right eye. The left eye was cured after several galvanocauterizations according to Gonin's method. This is only applicable if the cysticercus is adherent to the sclera.

C. Zimmermann.

Wibo. **The nasal nerve syndrome.** *Bull. Soc. Belge d'Opht.*, 1931, no. 62, p. 12.

This syndrome, according to the author, is characterized by the following triad: (1) a definite inflammatory lesion of the anterior hemisphere of the eye; (2) violent neuralgic pain in the orbito-nasal region of the same side, which detailed analysis permits one to localize at the root of the nose and the nasal ala corresponding to the inflamed eye; (3) a massive hydrorrhea accompanying the paroxysmal crises. In the two cases cited by the author rapid cure followed a few nasal treatments with a powder containing five percent cocaine and adrenalin. The anatomic basis of the syndrome is as follows: The nasal nerve is a branch of the ophthalmic. According to Testut it supplies the sensory root of the ciliary ganglion and several long ciliary nerves. The nasal nerve controls the entire sensibility of the eye, directly through the long ciliary and indirectly through the sensory root which it supplies to the ophthalmic ganglion. For these and other reasons certain writers favor calling the nasal nerve the oculonasal nerve.

J. B. Thomas.

18. HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Chayer, M. E. **The nurse's part in the conservation of vision.** *Sight-Saving Rev.*, 1931, v. 1, June, p. 34.

This paper by a nurse, stressing the prevention of visual defects, takes up placement of windows, arrangement of shades, arrangement of tables and chairs, size and character of the writing on the blackboard, lighting on dark days, distance of the printed page from the eye, check on children wearing

glasses, and detection of children needing special attention.

Ralph W. Danielson.

Henderson, C. G. **Prevention of blindness in India.** *Sight-Saving Rev.*, 1931, v. 1, June, p. 24.

The author states that the incidence of total blindness for India is 4.5 per thousand, and that there are three partially blind for each totally blind person. This would make 1,500,000 to 2,000,000 totally blind persons, and in addition to these from 4,000,000 to 6,000,000 with more or less impaired eyesight. Much of the blindness is preventable or remediable. Elliot is quoted as saying that large numbers of men and women suffering from glaucoma, cataract, and other curable diseases are allowed to hide in their villages like wounded animals, waiting only for their release by death. The paper discusses the prevalence of the different affections and the methods employed to combat them. *Ralph W. Danielson.*

Jaensch, P. A. **"Perfect sight without glasses."** The method of Dr. Bates and the character of the reform-sight schools. *Klin. M. f. Augenh.*, 1931, v. 87, Oct., p. 514.

As a duty for the protection of the public, Jaensch exposes to critical review William H. Bates's book "Perfect sight without glasses," demonstrating its shortcomings and fallacies as well as the misleading advertisements of the reform-sight schools.

C. Zimmermann.

Millar, Richard. **Natural color photography of the eye.** *Medical Arts*, 1931, v. 24, July, p. 460.

The article contains succinct directions on this type of photography.

Ralph W. Danielson.

Panneton, Philippe. **The establishment of an exact mathematical table for the calculation of industrial incapacities due to losses of visual acuity.** *Ann. d'Ocul.*, 1931, v. 168, Nov. pp. 905-923.

The nature of the contents of this article is expressed in the title. It is a

detailed consideration of the subject with numerous graphs and tables not suitable for abstraction.

H. Rommel Hildreth.

Resnik, Louis. **Eye protection in industry.** *Sight-Saving Rev.*, 1931, v. 1, June, p. 7.

Fifteen percent of the blind of America lost their sight because of occupational hazards. In terms of workmen's compensation, the eye hazards of industry are more serious than any other group of accident hazards, with the single exception of those resulting in death. More money is paid by employers each year as compensation for eye injuries than is paid for injuries to any other part of the body. In the principal industrial states, a total of more than ten million dollars a year is paid to workmen who have lost all or part of their sight; and this, the direct cost, presents only part of the picture. Analysis of some 75,000 accidents by the Travelers Insurance Company shows that the indirect loss to industry from accidents generally is four times as great as the direct loss, or the amount represented by compensation payments. The eye hazards of industry are enumerated and discussed.

The most important part of the paper is an outline prepared by the National Society for the Prevention of Blindness and entitled "A self-appraisal for safety engineers and other executives concerned with conservation of vision in industry". This outline covers the subject from the viewpoint of the industrial plant, the worker, and the job, and puts fifty-nine questions for those interested in this work.

Ralph W. Danielson.

Rolett, Daniel. **Statistics on scrofulous ophthalmia at the eye clinic of the University of Bern.** *Klin. M. f. Augenh.*, 1931, v. 87, Oct., p. 497.

The statistics compare two periods of five years, 1906 to 1910 and 1926 to 1930. They show that at the clinic scrofulous ophthalmia is the most frequent eye affection of children, and is essentially rarer in adults. Twice as many

girls as boys were affected. In the last few years the condition has become much less frequent than previously. Severe complicating corneal ulcers have also diminished, and relapses have sunk to half of the previous number. In the last few years the general condition of the children with scrofulous ophthalmia has been considerably better than twenty years ago, on account of constantly improving hygienic conditions, more light, air, and exercise in fresh air and sunlight, and better housing and cleanliness, with sensible sport.

C. Zimmermann.

Rush, Louise. Experiences of an exchange teacher in the myope classes in Glasgow, Scotland. *Sight-Saving Rev.*, 1931, v. 1, June, p. 15.

The author gives the plan of organization and conduct of these classes, which correspond to our sight-saving classes. In some of the schools each child has a blackboard on which he writes at arm's length at his eye level. The rooms are made with very large windows. The paper is embellished by most interesting descriptions of the children and of the customs and social conditions encountered in Scotland.

Ralph W. Danielson.

Scheib, G. F. Oculist or optician, which shall it be? *Illinois Med. Jour.*, 1931, v. 60, Aug., p. 155.

This article is written in the form of a dialogue in which one person explains to another the difference between an oculist and an optician. By concrete examples, the advantages of going to an oculist are stressed. *M. E. Marcove.*

Sherman, A. R. Observations in the Vienna eye clinics. *Jour. of the Med. Soc. of New Jersey*, 1931, v. 28, June, p. 485.

It is pointed out that the teaching is above the average because of the competition in obtaining an opportunity to teach and thus to amplify the small income obtained from the average private practice. One must remember that the amount of time spent by the Viennese physician in the teaching, charity

hospital is three or four times the amount of time spent in his office. The instructor's fee is about five dollars an hour, divided among the members of the class.

Sherman believes that many of the lectures are too elementary for post-graduate work, and that the better method is to pay ten dollars a month for the privilege of being a "hospitant" which admits one to the clinic, hospital, and operating room. Cases in the outpatient department are indexed so that a number of any particular type may be brought in on any one day. Fuchs's autumn course is recommended.

The remainder of the paper deals with the views and practices of the members of the Lindner, Elschnig, and Meller clinics on such subjects as cataract extraction, operative treatment of glaucoma, bacteriological examination of the conjunctiva before operation, Gonin cautery puncture, red-free light in ophthalmoscopy, and cylinder skiascopy.

Ralph W. Danielson.

Utstein, Gertrude. Spectacles in the making. *Sight-Saving Rev.*, 1931, v. 1, June, p. 41.

This paper is a résumé of the history and the development of the use of spectacles, giving interesting accounts of their early use and their social significance in various countries.

Ralph W. Danielson.

Weymann, M. F. Visual requirements for automobile drivers. *California and West. Med.*, 1931, v. 35, Aug., p. 101.

The author makes a strong plea for a thorough eye examination as one of the requirements for driving license. A questionnaire was sent to each state motor vehicle department to ascertain just what steps were being taken to measure the visual acuity and visual fields of those seeking license to drive. Of the forty-five departments from which answers were received, thirty-three had no visual requirements for non-professional drivers. The state of Delaware is the most stringent, requiring a visual acuity of 20/30 in both

eyes, or 20/20 in one eye. Vermont and Pennsylvania both demand 20/70 with both eyes. New Jersey requires 20/50 in each eye, while California requires only 20/50 with both eyes. In California an attempt was first made to demand 20/30 with both eyes, but so many drivers were thus excluded that the limit was lowered to 20/50. In New York a driver must have 20/40 vision with both eyes together. In Washington, D.C., the officials merely stated that acuity and color vision were tested, without giving details. In West Virginia the applicant is only asked if his sight is good. In Massachusetts and Maryland a study of the visual fields is required. The former demands 20/70 vision with both eyes, a 120-degree field, and recognition of red, green, and

yellow. Maryland asks 20/70 vision in each eye, or if one has less than 20/70 the other must have 20/40. A one-eyed individual may drive if he has 20/30 vision and has his car equipped with suitable mirrors. California is also contemplating the introduction of a visual field test.

The European standards of visual examination of automobile drivers as given by Professor Weekers are cited, that is: (1) visual acuity after correction of at least 20/40 in one eye and 20/200 in the other; (2) normal visual field in one eye; (3) no diplopia; (4) no marked diminution in light sense. The author urges the adoption of these requirements with the modification of a lower visual acuity to 20/50 in the better eye.

M. E. Marcove.

NEWS ITEMS

News Items in this issue were received from Drs. M. Paul Motto, Cleveland, and G. Oram Ring, Philadelphia. News Items should reach Dr. Melville Black, 424 Metropolitan building, Denver, by the twelfth of the month.

Deaths

Dr. Elmer Ellsworth Langley, Los Angeles, aged fifty years, died November twelfth, 1931.

Dr. Garrett Guy Ash, Bradford, Pennsylvania, aged forty-nine years, died October fourteenth last, of cirrhosis of the liver.

Dr. John Otis Weaver, Shenandoah, Iowa, aged forty-four years, died December thirteenth, 1931, of cerebral hemorrhage.

Dr. Burton Alexander Randall, Philadelphia, aged seventy-three years, died January fourth, of heart disease.

Dr. William Ellery Briggs, Sacramento, California, aged seventy-eight years, died November fifth, 1931, of cerebral hemorrhage.

Dr. William Alexander Walters, Los Angeles, aged fifty-one years, died December twenty-fifth, 1931, of a complication of diseases.

Miscellaneous

The Harlem Eye and Ear Hospital celebrated its fiftieth anniversary December 29, 1931.

Two courses on medical ophthalmology are being given at Mount Sinai Hospital, New York City, by Dr. Julius Wolff, on Wednesdays and Fridays to last for eight weeks.

Dr. W. H. Crisp, Denver, consulting editor, would be glad to hear from ophthalmologists who would be prepared to undertake abstracting from the Italian ophthalmic journals.

From the beginning of 1932 the *Annali di Ottalmologia e Clinica Oculistica* will be edited by Professors Contino, Lo Cascio, and Maggiore. This Italian journal will welcome contributions in Italian from American writers.

Prof. F. Terrien announces the annual course in ophthalmology at l'Hotel-Dieu in Paris under the auspices of the Faculte de Medicine de Paris. The dates are April 29 to May 27. The first half will be devoted to clinical and laboratory instruction and the latter to ocular surgery. The charge for each half is 300 francs.

Societies

At a recent meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia, Dr. Leighton F. Appleman was elected Chairman and Dr. Alexander G. Fewell, Clerk.

On Thursday, January 21, the Section on Ophthalmology of the College of Physicians met in Philadelphia. The program was as follows: Dr. J. Milton Griscom, "A corneal dystrophy"; Dr. Warren S. Reese, "Posterior lenticonus"; Drs. G. E. deSchweinitz, B. F. Baer and Perce DeLong, "Sarcoma of the choroid. A Clinico-pathological report"; Dr.

Edmund B. Spaeth, "Histologic study of the Iris. Inclusion operation in the eye of the rabbit". Discussion opened by Dr. DeLong. At the February meeting the following program was given: Dr. A. G. Fewell, "Neuroretinitis of luetic origin with star-shaped figure at the macula"; Dr. Luther C. Peter, "Enucleation by means of tonsil snare". Discussion opened by Dr. Edmund B. Spaeth. Dr. Wm. Zentmayer, "Bilateral metastatic carcinoma of the choroid. A Clinical Report". Discussion opened by Dr. E. A. Shumway.

The Kansas City Society of Ophthalmology and Otolaryngology held its regular meeting on January 21. Dr. W. L. Benedict, Rochester, Minnesota, gave a clinic at the Kansas City General Hospital in the afternoon. In the evening the Society entertained the members of the Mid-Western Section of the Triological Society at the Kansas City Athletic Club. Dr. Benedict spoke on "Tumors of the orbit", and Dr. Edmond P. Fowler, New York City, on "Deafness in school children".

The twelfth dinner meeting of the Cleveland Ophthalmological Club was held on February 2, 1932. Dr. Arthur J. Bedell addressed the club, speaking on the subject, "The wonders of fundus photography", a theoretical consideration and explanation of the camera with a clinical discussion of the value of photographs as given.

Personals

Dr. William L. Benedict, Rochester, Minnesota, talked on "Orbital tumors" before the Chicago Ophthalmological Society, January 18.

Dr. and Mrs. Charles A. Young, Roanoke, Virginia, sailed February 3 on the "Aquitania" for a thirty-day Mediterranean cruise.

Dr. William D. Jones, Dallas, was elected president of the Texas Ophthalmological and Otolaryngological Society at its annual convention in San Antonio, December 11-12, 1931.

Dr. Phillips Thygeson, recently of Denver, writes from Tunis that he is greatly enjoying his work with Dr. Nicolle at the Pasteur Institute in that city. Dr. Thygeson and his wife are having the interesting experience of living on the site of ancient Carthage, where excavations are in active progress.

At the February meeting of the Cleveland Ophthalmological Club, Dr. Arthur J. Bedell, of Albany, was the guest speaker. He presented a paper on "The wonders of fundus photography", and his extensive knowledge on the subject as well as interesting manner of presentation inspired the members to a most active discussion. While in Cleveland, Dr. Bedell was also guest of the Cleveland Clinic, where he spoke informally before the staff at a luncheon given in his honor.